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WO 01/77290 A2

(54) Title: **POLYNUCLEOTIDES ENCODING NOVEL SECRETED PROTEINS**

(57) Abstract: Isolated polynucleotides which have been derived from a variety of human tissue sources, and which encode novel secreted proteins, are provided. Also provided are methods for producing proteins using these polynucleotides, and the proteins so produced.

POLYNUCLEOTIDES ENCODING NOVEL SECRETED PROTEINS

RELATED APPLICATIONS

This application claims the benefit of prior-filed provisional patent application U.S. Serial No. 60/194,941 entitled "Polynucleotides Encoding Novel Secreted Proteins", filed April 6, 2000. The content of the above-referenced application is incorporated in its entirety.

FIELD OF THE INVENTION

The present invention provides novel polynucleotides and proteins encoded by such polynucleotides, along with therapeutic, diagnostic and research utilities for these polynucleotides and proteins.

BACKGROUND OF THE INVENTION

Gargantuan efforts have been employed by various investigational projects to randomly sequence portions of naturally-occurring cDNAs. The rationale behind this approach to identification and sequencing genes is founded in two basic principles: (1) that transcribed cDNAs represent the product of the most important genes, namely those that are actually expressed *in vivo*, and (2) that efforts to sequence genes and other portions of the genome of target organisms which are not actually expressed wastes substantial effort on areas not likely to yield genetic information of therapeutic importance. Thus, the high-throughput sequencing efforts focus on only those portions of the genome which are expressed. The randomly produced cDNA sequences represent "expressed sequence tags" or "ESTs", which identify and can be used as probes for the longer, full-length cDNA or genomic sequence from which they were transcribed.

Although this "shortcut" approach to genomic sequencing presents savings of effort compared to sequencing of the complete genome, it still produced a vast array of ESTs which may not be directly useful as protein therapeutics. To date, the majority of protein-related drug discovery has focused on the use of secreted proteins to produce a desired therapeutic effect. Since the EST approach theoretically identifies all expressed proteins, it produces an EST library which contains a mixture of secreted proteins (such as hormones, cytokines and receptors) and non-secreted proteins (such as, for example, metabolic enzymes and cellular structural proteins), without identifying which ESTs correspond to proteins falling into either category. As a result, these methods are not optimally tailored to the needs of investigators searching for secreted proteins because they must separate the secreted "wheat" from the non-secreted "chaff", wasting effort and resources in the process.

Technology aimed at the discovery of protein factors (including e.g., cytokines, such as lymphokines, interferons, CSFs and interleukins) has matured rapidly over the past decade. The now routine hybridization cloning and expression cloning techniques clone novel polynucleotides "directly" in the sense that they rely on information directly related to the discovered protein (i.e., partial DNA/amino acid sequence of the protein in the case of hybridization cloning; activity of the protein in the case of expression cloning).

More recent "indirect" cloning techniques such as signal sequence cloning, which isolates DNA sequences based on the presence of a now well-recognized secretory leader sequence motif, as well as various PCR-based or low stringency hybridization cloning techniques, have advanced the state of the art by making available large numbers of DNA/amino acid sequences for proteins that are known to have biological activity by virtue of their secreted nature in the case of leader sequence cloning, or by virtue of the cell or tissue source in the case of PCR-based techniques. Co-assigned U.S. Patent No. 5,536,637, which is incorporated herein by reference, provides methods for focusing genomic sequencing efforts on sequences encoding the secreted proteins which are of most interest for identification of protein therapeutics. The '637 patent discloses a "signal sequence trap" which selectively identifies partial sequences encoding secreted proteins, namely "secreted expressed sequence tags" or "sESTs". The sequences of these sESTs can be used to design probes to isolate the full-length cDNA clones that encode secreted proteins.

It is to these secreted proteins and the full-length polynucleotides encoding them that the present invention is directed.

SUMMARY OF THE INVENTION

The present invention provides for full-length cDNAs isolated from a variety of human RNA/cDNA sources which encode novel secreted proteins.

In preferred embodiments, the present invention provides an isolated polynucleotide comprising a nucleotide sequence selected from the group consisting of:

SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID

NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:66, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:94, SEQ ID NO:95, SEQ ID NO:96, SEQ ID NO:97, SEQ ID NO:98, SEQ ID NO:99, SEQ ID NO:100, SEQ ID NO:101, SEQ ID NO:102, SEQ ID NO:103, SEQ ID NO:104, SEQ ID NO:105, SEQ ID NO:106, SEQ ID NO:107, SEQ ID NO:108, SEQ ID NO:109, SEQ ID NO:110, SEQ ID NO:111, SEQ ID NO:112, SEQ ID NO:113, SEQ ID NO:114, SEQ ID NO:115, SEQ ID NO:116, SEQ ID NO:117, SEQ ID NO:118, SEQ ID NO:119, SEQ ID NO:120, SEQ ID NO:121, SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, SEQ ID NO:132, SEQ ID NO:133, SEQ ID NO:134, SEQ ID NO:135, SEQ ID NO:136, SEQ ID NO:137, SEQ ID NO:138, SEQ ID NO:139, SEQ ID NO:140, SEQ ID NO:141, SEQ ID NO:142, SEQ ID NO:143, SEQ ID NO:144, SEQ ID NO:145, SEQ ID NO:146, SEQ ID NO:147, SEQ ID NO:148, SEQ ID NO:149, SEQ ID NO:150, SEQ ID NO:151, SEQ ID NO:152, SEQ ID NO:153, SEQ ID NO:154, SEQ ID NO:155, SEQ ID NO:156, SEQ ID NO:157, SEQ ID NO:158, SEQ ID NO:159, SEQ ID NO:160, SEQ ID NO:161, SEQ ID NO:162, SEQ ID NO:163, SEQ ID NO:164, SEQ ID NO:165, SEQ ID NO:166, SEQ ID NO:167, SEQ ID NO:168, SEQ ID NO:169, SEQ ID NO:170, SEQ ID NO:171, SEQ ID NO:172, SEQ ID NO:173, SEQ ID NO:174, SEQ ID NO:175, SEQ ID NO:176, SEQ ID NO:177, SEQ ID NO:178, SEQ ID NO:179, SEQ ID NO:180, SEQ ID NO:181, SEQ ID NO:182, SEQ ID NO:183, SEQ ID NO:184, SEQ ID NO:185, SEQ ID NO:186, SEQ ID NO:187, SEQ ID NO:188, SEQ ID NO:189, SEQ ID NO:190, SEQ ID NO:191, SEQ ID NO:192, SEQ ID NO:193, SEQ ID NO:194, SEQ ID NO:195, SEQ ID NO:196, SEQ ID NO:197, SEQ ID NO:198, SEQ ID NO:199, SEQ ID NO:200, SEQ ID NO:201, SEQ ID NO:202, SEQ ID NO:203, SEQ ID NO:204, SEQ ID NO:205, SEQ ID NO:206, SEQ ID NO:207, SEQ ID NO:208, SEQ ID NO:209, SEQ ID NO:210, SEQ ID NO:211, SEQ ID NO:212, SEQ ID NO:213, SEQ ID NO:214, SEQ ID NO:215, SEQ ID NO:216, SEQ ID NO:217, SEQ ID NO:218, SEQ ID NO:219, SEQ ID NO:220, SEQ ID NO:221, SEQ ID NO:222, SEQ ID NO:223, SEQ ID NO:224, SEQ ID NO:225, SEQ ID NO:226, SEQ ID NO:227, SEQ ID NO:228, SEQ ID NO:229, SEQ ID NO:230, SEQ ID NO:231, SEQ ID NO:232, SEQ ID NO:233, SEQ ID NO:234, SEQ ID NO:235, SEQ ID NO:236, SEQ ID NO:237, SEQ ID NO:238, SEQ ID NO:239, SEQ ID NO:240, SEQ ID NO:241, SEQ ID

NO:427, SEQ ID NO:428, SEQ ID NO:429, SEQ ID NO:430, SEQ ID NO:431, SEQ ID NO:432, SEQ ID NO:433, SEQ ID NO:434, SEQ ID NO:435, SEQ ID NO:436, SEQ ID NO:437, SEQ ID NO:438, SEQ ID NO:439, SEQ ID NO:440, SEQ ID NO:441, SEQ ID NO:442, SEQ ID NO:443, SEQ ID NO:444, SEQ ID NO:445, SEQ ID NO:446, SEQ ID NO:447, SEQ ID NO:448, SEQ ID NO:449, SEQ ID NO:450, SEQ ID NO:451, SEQ ID NO:452, SEQ ID NO:453, SEQ ID NO:454, SEQ ID NO:455, SEQ ID NO:456, SEQ ID NO:457, SEQ ID NO:458, SEQ ID NO:459, SEQ ID NO:460, SEQ ID NO:461, SEQ ID NO:462, SEQ ID NO:463, SEQ ID NO:464, SEQ ID NO:465, SEQ ID NO:466, SEQ ID NO:467, SEQ ID NO:468, SEQ ID NO:469, SEQ ID NO:470, SEQ ID NO:471, SEQ ID NO:472, SEQ ID NO:473, SEQ ID NO:474, SEQ ID NO:475, SEQ ID NO:476, SEQ ID NO:477, SEQ ID NO:478, SEQ ID NO:479, SEQ ID NO:480, SEQ ID NO:481, SEQ ID NO:482, SEQ ID NO:483, SEQ ID NO:484, SEQ ID NO:485, SEQ ID NO:486, SEQ ID NO:487, SEQ ID NO:488, SEQ ID NO:489, SEQ ID NO:490, SEQ ID NO:491, SEQ ID NO:492, SEQ ID NO:493, SEQ ID NO:494, SEQ ID NO:495, SEQ ID NO:496, SEQ ID NO:497, SEQ ID NO:498, SEQ ID NO:499, SEQ ID NO:500, SEQ ID NO:501, SEQ ID NO:502, SEQ ID NO:503, SEQ ID NO:504, SEQ ID NO:505, SEQ ID NO:506, SEQ ID NO:507, SEQ ID NO:508, SEQ ID NO:509, SEQ ID NO:510, SEQ ID NO:511, SEQ ID NO:512, SEQ ID NO:513, SEQ ID NO:514, SEQ ID NO:515, SEQ ID NO:516, SEQ ID NO:517, SEQ ID NO:518, SEQ ID NO:519, SEQ ID NO:520, SEQ ID NO:521, SEQ ID NO:522, SEQ ID NO:523, SEQ ID NO:524, SEQ ID NO:525, SEQ ID NO:526, SEQ ID NO:527, SEQ ID NO:528, SEQ ID NO:529, SEQ ID NO:530, SEQ ID NO:531, SEQ ID NO:532, SEQ ID NO:533, SEQ ID NO:534, SEQ ID NO:535, SEQ ID NO:536, SEQ ID NO:537, SEQ ID NO:538, SEQ ID NO:539, SEQ ID NO:540, SEQ ID NO:541, SEQ ID NO:542, SEQ ID NO:543, SEQ ID NO:544, SEQ ID NO:545, SEQ ID NO:546, SEQ ID NO:547, SEQ ID NO:548, SEQ ID NO:549, SEQ ID NO:550, SEQ ID NO:551, SEQ ID NO:552, SEQ ID NO:553, SEQ ID NO:554, SEQ ID NO:555, SEQ ID NO:556, SEQ ID NO:557, SEQ ID NO:558, SEQ ID NO:559, SEQ ID NO:560, SEQ ID NO:561, SEQ ID NO:562, SEQ ID NO:563, SEQ ID NO:564, SEQ ID NO:565, SEQ ID NO:566, SEQ ID NO:567, SEQ ID NO:568, SEQ ID NO:569, SEQ ID NO:570, SEQ ID NO:571, SEQ ID NO:572, SEQ ID NO:573, SEQ ID NO:574, SEQ ID NO:575, SEQ ID NO:576, SEQ ID NO:577, SEQ ID NO:578, SEQ ID NO:579, SEQ ID NO:580, SEQ ID NO:581, SEQ ID NO:582, SEQ ID NO:583, SEQ ID NO:584, SEQ ID NO:585, SEQ ID NO:586, SEQ ID NO:587, SEQ ID NO:588, SEQ ID NO:589, SEQ ID NO:590, SEQ ID NO:591, SEQ ID NO:592, SEQ ID NO:593, SEQ ID NO:594, SEQ ID NO:595, SEQ ID NO:596, SEQ ID NO:597, SEQ ID NO:598, SEQ ID NO:599, SEQ ID NO:600, SEQ ID NO:601, SEQ ID NO:602, SEQ ID NO:603, SEQ ID NO:604, SEQ ID NO:605, SEQ ID NO:606, SEQ ID NO:607, SEQ ID NO:608, SEQ ID NO:609, SEQ ID NO:610, SEQ ID NO:611, SEQ ID

NO:612, SEQ ID NO:613, SEQ ID NO:614, SEQ ID NO:615, SEQ ID NO:616, SEQ ID NO:617, SEQ ID NO:618, SEQ ID NO:619, SEQ ID NO:620, SEQ ID NO:621, SEQ ID NO:622, SEQ ID NO:623, SEQ ID NO:624, SEQ ID NO:625;

or a complement of said sequence.

In other embodiments, the present invention provides an isolated polynucleotide consisting of a nucleotide sequence selected from the group consisting of:

SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:66, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:94, SEQ ID NO:95, SEQ ID NO:96, SEQ ID NO:97, SEQ ID NO:98, SEQ ID NO:99, SEQ ID NO:100, SEQ ID NO:101, SEQ ID NO:102, SEQ ID NO:103, SEQ ID NO:104, SEQ ID NO:105, SEQ ID NO:106, SEQ ID NO:107, SEQ ID NO:108, SEQ ID NO:109, SEQ ID NO:110, SEQ ID NO:111, SEQ ID NO:112, SEQ ID NO:113, SEQ ID NO:114, SEQ ID NO:115, SEQ ID NO:116, SEQ ID NO:117, SEQ ID NO:118, SEQ ID NO:119, SEQ ID NO:120, SEQ ID NO:121, SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, SEQ ID NO:132, SEQ ID NO:133, SEQ ID NO:134, SEQ ID NO:135, SEQ ID NO:136, SEQ ID NO:137, SEQ ID NO:138, SEQ ID NO:139, SEQ ID NO:140, SEQ ID NO:141, SEQ ID NO:142, SEQ ID NO:143, SEQ ID NO:144, SEQ ID NO:145, SEQ ID NO:146, SEQ ID NO:147, SEQ ID NO:148, SEQ ID NO:149, SEQ ID NO:150, SEQ ID NO:151, SEQ ID NO:152, SEQ ID NO:153, SEQ ID NO:154, SEQ ID NO:155, SEQ ID NO:156, SEQ ID NO:157, SEQ ID NO:158, SEQ ID NO:159, SEQ ID NO:160, SEQ ID NO:161, SEQ ID

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NO:347, SEQ ID NO:348, SEQ ID NO:349, SEQ ID NO:350, SEQ ID NO:351, SEQ ID NO:352, SEQ ID NO:353, SEQ ID NO:354, SEQ ID NO:355, SEQ ID NO:356, SEQ ID NO:357, SEQ ID NO:358, SEQ ID NO:359, SEQ ID NO:360, SEQ ID NO:361, SEQ ID NO:362, SEQ ID NO:363, SEQ ID NO:364, SEQ ID NO:365, SEQ ID NO:366, SEQ ID NO:367, SEQ ID NO:368, SEQ ID NO:369, SEQ ID NO:370, SEQ ID NO:371, SEQ ID NO:372, SEQ ID NO:373, SEQ ID NO:374, SEQ ID NO:375, SEQ ID NO:376, SEQ ID NO:377, SEQ ID NO:378, SEQ ID NO:379, SEQ ID NO:380, SEQ ID NO:381, SEQ ID NO:382, SEQ ID NO:383, SEQ ID NO:384, SEQ ID NO:385, SEQ ID NO:386, SEQ ID NO:387, SEQ ID NO:388, SEQ ID NO:389, SEQ ID NO:390, SEQ ID NO:391, SEQ ID NO:392, SEQ ID NO:393, SEQ ID NO:394, SEQ ID NO:395, SEQ ID NO:396, SEQ ID NO:397, SEQ ID NO:398, SEQ ID NO:399, SEQ ID NO:400, SEQ ID NO:401, SEQ ID NO:402, SEQ ID NO:403, SEQ ID NO:404, SEQ ID NO:405, SEQ ID NO:406, SEQ ID NO:407, SEQ ID NO:408, SEQ ID NO:409, SEQ ID NO:410, SEQ ID NO:411, SEQ ID NO:412, SEQ ID NO:413, SEQ ID NO:414, SEQ ID NO:415, SEQ ID NO:416, SEQ ID NO:417, SEQ ID NO:418, SEQ ID NO:419, SEQ ID NO:420, SEQ ID NO:421, SEQ ID NO:422, SEQ ID NO:423, SEQ ID NO:424, SEQ ID NO:425, SEQ ID NO:426, SEQ ID NO:427, SEQ ID NO:428, SEQ ID NO:429, SEQ ID NO:430, SEQ ID NO:431, SEQ ID NO:432, SEQ ID NO:433, SEQ ID NO:434, SEQ ID NO:435, SEQ ID NO:436, SEQ ID NO:437, SEQ ID NO:438, SEQ ID NO:439, SEQ ID NO:440, SEQ ID NO:441, SEQ ID NO:442, SEQ ID NO:443, SEQ ID NO:444, SEQ ID NO:445, SEQ ID NO:446, SEQ ID NO:447, SEQ ID NO:448, SEQ ID NO:449, SEQ ID NO:450, SEQ ID NO:451, SEQ ID NO:452, SEQ ID NO:453, SEQ ID NO:454, SEQ ID NO:455, SEQ ID NO:456, SEQ ID NO:457, SEQ ID NO:458, SEQ ID NO:459, SEQ ID NO:460, SEQ ID NO:461, SEQ ID NO:462, SEQ ID NO:463, SEQ ID NO:464, SEQ ID NO:465, SEQ ID NO:466, SEQ ID NO:467, SEQ ID NO:468, SEQ ID NO:469, SEQ ID NO:470, SEQ ID NO:471, SEQ ID NO:472, SEQ ID NO:473, SEQ ID NO:474, SEQ ID NO:475, SEQ ID NO:476, SEQ ID NO:477, SEQ ID NO:478, SEQ ID NO:479, SEQ ID NO:480, SEQ ID NO:481, SEQ ID NO:482, SEQ ID NO:483, SEQ ID NO:484, SEQ ID NO:485, SEQ ID NO:486, SEQ ID NO:487, SEQ ID NO:488, SEQ ID NO:489, SEQ ID NO:490, SEQ ID NO:491, SEQ ID NO:492, SEQ ID NO:493, SEQ ID NO:494, SEQ ID NO:495, SEQ ID NO:496, SEQ ID NO:497, SEQ ID NO:498, SEQ ID NO:499, SEQ ID NO:500, SEQ ID NO:501, SEQ ID NO:502, SEQ ID NO:503, SEQ ID NO:504, SEQ ID NO:505, SEQ ID NO:506, SEQ ID NO:507, SEQ ID NO:508, SEQ ID NO:509, SEQ ID NO:510, SEQ ID NO:511, SEQ ID NO:512, SEQ ID NO:513, SEQ ID NO:514, SEQ ID NO:515, SEQ ID NO:516, SEQ ID NO:517, SEQ ID NO:518, SEQ ID NO:519, SEQ ID NO:520, SEQ ID NO:521, SEQ ID NO:522, SEQ ID NO:523, SEQ ID NO:524, SEQ ID NO:525, SEQ ID NO:526, SEQ ID NO:527, SEQ ID NO:528, SEQ ID NO:529, SEQ ID NO:530, SEQ ID NO:531, SEQ ID

NO:532, SEQ ID NO:533, SEQ ID NO:534, SEQ ID NO:535, SEQ ID NO:536, SEQ ID NO:537, SEQ ID NO:538, SEQ ID NO:539, SEQ ID NO:540, SEQ ID NO:541, SEQ ID NO:542, SEQ ID NO:543, SEQ ID NO:544, SEQ ID NO:545, SEQ ID NO:546, SEQ ID NO:547, SEQ ID NO:548, SEQ ID NO:549, SEQ ID NO:550, SEQ ID NO:551, SEQ ID NO:552, SEQ ID NO:553, SEQ ID NO:554, SEQ ID NO:555, SEQ ID NO:556, SEQ ID NO:557, SEQ ID NO:558, SEQ ID NO:559, SEQ ID NO:560, SEQ ID NO:561, SEQ ID NO:562, SEQ ID NO:563, SEQ ID NO:564, SEQ ID NO:565, SEQ ID NO:566, SEQ ID NO:567, SEQ ID NO:568, SEQ ID NO:569, SEQ ID NO:570, SEQ ID NO:571, SEQ ID NO:572, SEQ ID NO:573, SEQ ID NO:574, SEQ ID NO:575, SEQ ID NO:576, SEQ ID NO:577, SEQ ID NO:578, SEQ ID NO:579, SEQ ID NO:580, SEQ ID NO:581, SEQ ID NO:582, SEQ ID NO:583, SEQ ID NO:584, SEQ ID NO:585, SEQ ID NO:586, SEQ ID NO:587, SEQ ID NO:588, SEQ ID NO:589, SEQ ID NO:590, SEQ ID NO:591, SEQ ID NO:592, SEQ ID NO:593, SEQ ID NO:594, SEQ ID NO:595, SEQ ID NO:596, SEQ ID NO:597, SEQ ID NO:598, SEQ ID NO:599, SEQ ID NO:600, SEQ ID NO:601, SEQ ID NO:602, SEQ ID NO:603, SEQ ID NO:604, SEQ ID NO:605, SEQ ID NO:606, SEQ ID NO:607, SEQ ID NO:608, SEQ ID NO:609, SEQ ID NO:610, SEQ ID NO:611, SEQ ID NO:612, SEQ ID NO:613, SEQ ID NO:614, SEQ ID NO:615, SEQ ID NO:616, SEQ ID NO:617, SEQ ID NO:618, SEQ ID NO:619, SEQ ID NO:620, SEQ ID NO:621, SEQ ID NO:622, SEQ ID NO:623, SEQ ID NO:624, SEQ ID NO:625;

or a complement of said sequence.

In further embodiments, the present invention provides an isolated polynucleotide consisting essentially of a nucleotide sequence selected from the group consisting of:

SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:66, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ

ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:94, SEQ ID NO:95, SEQ ID NO:96, SEQ ID NO:97, SEQ ID NO:98, SEQ ID NO:99, SEQ ID NO:100, SEQ ID NO:101, SEQ ID NO:102, SEQ ID NO:103, SEQ ID NO:104, SEQ ID NO:105, SEQ ID NO:106, SEQ ID NO:107, SEQ ID NO:108, SEQ ID NO:109, SEQ ID NO:110, SEQ ID NO:111, SEQ ID NO:112, SEQ ID NO:113, SEQ ID NO:114, SEQ ID NO:115, SEQ ID NO:116, SEQ ID NO:117, SEQ ID NO:118, SEQ ID NO:119, SEQ ID NO:120, SEQ ID NO:121, SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, SEQ ID NO:132, SEQ ID NO:133, SEQ ID NO:134, SEQ ID NO:135, SEQ ID NO:136, SEQ ID NO:137, SEQ ID NO:138, SEQ ID NO:139, SEQ ID NO:140, SEQ ID NO:141, SEQ ID NO:142, SEQ ID NO:143, SEQ ID NO:144, SEQ ID NO:145, SEQ ID NO:146, SEQ ID NO:147, SEQ ID NO:148, SEQ ID NO:149, SEQ ID NO:150, SEQ ID NO:151, SEQ ID NO:152, SEQ ID NO:153, SEQ ID NO:154, SEQ ID NO:155, SEQ ID NO:156, SEQ ID NO:157, SEQ ID NO:158, SEQ ID NO:159, SEQ ID NO:160, SEQ ID NO:161, SEQ ID NO:162, SEQ ID NO:163, SEQ ID NO:164, SEQ ID NO:165, SEQ ID NO:166, SEQ ID NO:167, SEQ ID NO:168, SEQ ID NO:169, SEQ ID NO:170, SEQ ID NO:171, SEQ ID NO:172, SEQ ID NO:173, SEQ ID NO:174, SEQ ID NO:175, SEQ ID NO:176, SEQ ID NO:177, SEQ ID NO:178, SEQ ID NO:179, SEQ ID NO:180, SEQ ID NO:181, SEQ ID NO:182, SEQ ID NO:183, SEQ ID NO:184, SEQ ID NO:185, SEQ ID NO:186, SEQ ID NO:187, SEQ ID NO:188, SEQ ID NO:189, SEQ ID NO:190, SEQ ID NO:191, SEQ ID NO:192, SEQ ID NO:193, SEQ ID NO:194, SEQ ID NO:195, SEQ ID NO:196, SEQ ID NO:197, SEQ ID NO:198, SEQ ID NO:199, SEQ ID NO:200, SEQ ID NO:201, SEQ ID NO:202, SEQ ID NO:203, SEQ ID NO:204, SEQ ID NO:205, SEQ ID NO:206, SEQ ID NO:207, SEQ ID NO:208, SEQ ID NO:209, SEQ ID NO:210, SEQ ID NO:211, SEQ ID NO:212, SEQ ID NO:213, SEQ ID NO:214, SEQ ID NO:215, SEQ ID NO:216, SEQ ID NO:217, SEQ ID NO:218, SEQ ID NO:219, SEQ ID NO:220, SEQ ID NO:221, SEQ ID NO:222, SEQ ID NO:223, SEQ ID NO:224, SEQ ID NO:225, SEQ ID NO:226, SEQ ID NO:227, SEQ ID NO:228, SEQ ID NO:229, SEQ ID NO:230, SEQ ID NO:231, SEQ ID NO:232, SEQ ID NO:233, SEQ ID NO:234, SEQ ID NO:235, SEQ ID NO:236, SEQ ID NO:237, SEQ ID NO:238, SEQ ID NO:239, SEQ ID NO:240, SEQ ID NO:241, SEQ ID NO:242, SEQ ID NO:243, SEQ ID NO:244, SEQ ID NO:245, SEQ ID NO:246, SEQ ID NO:247, SEQ ID NO:248, SEQ ID NO:249, SEQ ID NO:250, SEQ ID NO:251, SEQ ID NO:252, SEQ ID NO:253, SEQ ID NO:254, SEQ ID NO:255, SEQ ID NO:256, SEQ ID NO:257, SEQ ID NO:258, SEQ ID NO:259, SEQ ID NO:260, SEQ ID NO:261, SEQ ID NO:262, SEQ ID NO:263, SEQ ID NO:264, SEQ ID NO:265, SEQ ID NO:266, SEQ ID

NO:267, SEQ ID NO:268, SEQ ID NO:269, SEQ ID NO:270, SEQ ID NO:271, SEQ ID NO:272, SEQ ID NO:273, SEQ ID NO:274, SEQ ID NO:275, SEQ ID NO:276, SEQ ID NO:277, SEQ ID NO:278, SEQ ID NO:279, SEQ ID NO:280, SEQ ID NO:281, SEQ ID NO:282, SEQ ID NO:283, SEQ ID NO:284, SEQ ID NO:285, SEQ ID NO:286, SEQ ID NO:287, SEQ ID NO:288, SEQ ID NO:289, SEQ ID NO:290, SEQ ID NO:291, SEQ ID NO:292, SEQ ID NO:293, SEQ ID NO:294, SEQ ID NO:295, SEQ ID NO:296, SEQ ID NO:297, SEQ ID NO:298, SEQ ID NO:299, SEQ ID NO:300, SEQ ID NO:301, SEQ ID NO:302, SEQ ID NO:303, SEQ ID NO:304, SEQ ID NO:305, SEQ ID NO:306, SEQ ID NO:307, SEQ ID NO:308, SEQ ID NO:309, SEQ ID NO:310, SEQ ID NO:311, SEQ ID NO:312, SEQ ID NO:313, SEQ ID NO:314, SEQ ID NO:315, SEQ ID NO:316, SEQ ID NO:317, SEQ ID NO:318, SEQ ID NO:319, SEQ ID NO:320, SEQ ID NO:321, SEQ ID NO:322, SEQ ID NO:323, SEQ ID NO:324, SEQ ID NO:325, SEQ ID NO:326, SEQ ID NO:327, SEQ ID NO:328, SEQ ID NO:329, SEQ ID NO:330, SEQ ID NO:331, SEQ ID NO:332, SEQ ID NO:333, SEQ ID NO:334, SEQ ID NO:335, SEQ ID NO:336, SEQ ID NO:337, SEQ ID NO:338, SEQ ID NO:339, SEQ ID NO:340, SEQ ID NO:341, SEQ ID NO:342, SEQ ID NO:343, SEQ ID NO:344, SEQ ID NO:345, SEQ ID NO:346, SEQ ID NO:347, SEQ ID NO:348, SEQ ID NO:349, SEQ ID NO:350, SEQ ID NO:351, SEQ ID NO:352, SEQ ID NO:353, SEQ ID NO:354, SEQ ID NO:355, SEQ ID NO:356, SEQ ID NO:357, SEQ ID NO:358, SEQ ID NO:359, SEQ ID NO:360, SEQ ID NO:361, SEQ ID NO:362, SEQ ID NO:363, SEQ ID NO:364, SEQ ID NO:365, SEQ ID NO:366, SEQ ID NO:367, SEQ ID NO:368, SEQ ID NO:369, SEQ ID NO:370, SEQ ID NO:371, SEQ ID NO:372, SEQ ID NO:373, SEQ ID NO:374, SEQ ID NO:375, SEQ ID NO:376, SEQ ID NO:377, SEQ ID NO:378, SEQ ID NO:379, SEQ ID NO:380, SEQ ID NO:381, SEQ ID NO:382, SEQ ID NO:383, SEQ ID NO:384, SEQ ID NO:385, SEQ ID NO:386, SEQ ID NO:387, SEQ ID NO:388, SEQ ID NO:389, SEQ ID NO:390, SEQ ID NO:391, SEQ ID NO:392, SEQ ID NO:393, SEQ ID NO:394, SEQ ID NO:395, SEQ ID NO:396, SEQ ID NO:397, SEQ ID NO:398, SEQ ID NO:399, SEQ ID NO:400, SEQ ID NO:401, SEQ ID NO:402, SEQ ID NO:403, SEQ ID NO:404, SEQ ID NO:405, SEQ ID NO:406, SEQ ID NO:407, SEQ ID NO:408, SEQ ID NO:409, SEQ ID NO:410, SEQ ID NO:411, SEQ ID NO:412, SEQ ID NO:413, SEQ ID NO:414, SEQ ID NO:415, SEQ ID NO:416, SEQ ID NO:417, SEQ ID NO:418, SEQ ID NO:419, SEQ ID NO:420, SEQ ID NO:421, SEQ ID NO:422, SEQ ID NO:423, SEQ ID NO:424, SEQ ID NO:425, SEQ ID NO:426, SEQ ID NO:427, SEQ ID NO:428, SEQ ID NO:429, SEQ ID NO:430, SEQ ID NO:431, SEQ ID NO:432, SEQ ID NO:433, SEQ ID NO:434, SEQ ID NO:435, SEQ ID NO:436, SEQ ID NO:437, SEQ ID NO:438, SEQ ID NO:439, SEQ ID NO:440, SEQ ID NO:441, SEQ ID NO:442, SEQ ID NO:443, SEQ ID NO:444, SEQ ID NO:445, SEQ ID NO:446, SEQ ID NO:447, SEQ ID NO:448, SEQ ID NO:449, SEQ ID NO:450, SEQ ID NO:451, SEQ ID

NO:452, SEQ ID NO:453, SEQ ID NO:454, SEQ ID NO:455, SEQ ID NO:456, SEQ ID NO:457, SEQ ID NO:458, SEQ ID NO:459, SEQ ID NO:460, SEQ ID NO:461, SEQ ID NO:462, SEQ ID NO:463, SEQ ID NO:464, SEQ ID NO:465, SEQ ID NO:466, SEQ ID NO:467, SEQ ID NO:468, SEQ ID NO:469, SEQ ID NO:470, SEQ ID NO:471, SEQ ID NO:472, SEQ ID NO:473, SEQ ID NO:474, SEQ ID NO:475, SEQ ID NO:476, SEQ ID NO:477, SEQ ID NO:478, SEQ ID NO:479, SEQ ID NO:480, SEQ ID NO:481, SEQ ID NO:482, SEQ ID NO:483, SEQ ID NO:484, SEQ ID NO:485, SEQ ID NO:486, SEQ ID NO:487, SEQ ID NO:488, SEQ ID NO:489, SEQ ID NO:490, SEQ ID NO:491, SEQ ID NO:492, SEQ ID NO:493, SEQ ID NO:494, SEQ ID NO:495, SEQ ID NO:496, SEQ ID NO:497, SEQ ID NO:498, SEQ ID NO:499, SEQ ID NO:500, SEQ ID NO:501, SEQ ID NO:502, SEQ ID NO:503, SEQ ID NO:504, SEQ ID NO:505, SEQ ID NO:506, SEQ ID NO:507, SEQ ID NO:508, SEQ ID NO:509, SEQ ID NO:510, SEQ ID NO:511, SEQ ID NO:512, SEQ ID NO:513, SEQ ID NO:514, SEQ ID NO:515, SEQ ID NO:516, SEQ ID NO:517, SEQ ID NO:518, SEQ ID NO:519, SEQ ID NO:520, SEQ ID NO:521, SEQ ID NO:522, SEQ ID NO:523, SEQ ID NO:524, SEQ ID NO:525, SEQ ID NO:526, SEQ ID NO:527, SEQ ID NO:528, SEQ ID NO:529, SEQ ID NO:530, SEQ ID NO:531, SEQ ID NO:532, SEQ ID NO:533, SEQ ID NO:534, SEQ ID NO:535, SEQ ID NO:536, SEQ ID NO:537, SEQ ID NO:538, SEQ ID NO:539, SEQ ID NO:540, SEQ ID NO:541, SEQ ID NO:542, SEQ ID NO:543, SEQ ID NO:544, SEQ ID NO:545, SEQ ID NO:546, SEQ ID NO:547, SEQ ID NO:548, SEQ ID NO:549, SEQ ID NO:550, SEQ ID NO:551, SEQ ID NO:552, SEQ ID NO:553, SEQ ID NO:554, SEQ ID NO:555, SEQ ID NO:556, SEQ ID NO:557, SEQ ID NO:558, SEQ ID NO:559, SEQ ID NO:560, SEQ ID NO:561, SEQ ID NO:562, SEQ ID NO:563, SEQ ID NO:564, SEQ ID NO:565, SEQ ID NO:566, SEQ ID NO:567, SEQ ID NO:568, SEQ ID NO:569, SEQ ID NO:570, SEQ ID NO:571, SEQ ID NO:572, SEQ ID NO:573, SEQ ID NO:574, SEQ ID NO:575, SEQ ID NO:576, SEQ ID NO:577, SEQ ID NO:578, SEQ ID NO:579, SEQ ID NO:580, SEQ ID NO:581, SEQ ID NO:582, SEQ ID NO:583, SEQ ID NO:584, SEQ ID NO:585, SEQ ID NO:586, SEQ ID NO:587, SEQ ID NO:588, SEQ ID NO:589, SEQ ID NO:590, SEQ ID NO:591, SEQ ID NO:592, SEQ ID NO:593, SEQ ID NO:594, SEQ ID NO:595, SEQ ID NO:596, SEQ ID NO:597, SEQ ID NO:598, SEQ ID NO:599, SEQ ID NO:600, SEQ ID NO:601, SEQ ID NO:602, SEQ ID NO:603, SEQ ID NO:604, SEQ ID NO:605, SEQ ID NO:606, SEQ ID NO:607, SEQ ID NO:608, SEQ ID NO:609, SEQ ID NO:610, SEQ ID NO:611, SEQ ID NO:612, SEQ ID NO:613, SEQ ID NO:614, SEQ ID NO:615, SEQ ID NO:616, SEQ ID NO:617, SEQ ID NO:618, SEQ ID NO:619, SEQ ID NO:620, SEQ ID NO:621, SEQ ID NO:622, SEQ ID NO:623, SEQ ID NO:624, SEQ ID NO:625;

or a complement of said sequence.

In yet other embodiments, the present invention provides an isolated polynucleotide comprising a nucleotide sequence which hybridizes to a sequence selected from the group consisting of:

SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:66, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:94, SEQ ID NO:95, SEQ ID NO:96, SEQ ID NO:97, SEQ ID NO:98, SEQ ID NO:99, SEQ ID NO:100, SEQ ID NO:101, SEQ ID NO:102, SEQ ID NO:103, SEQ ID NO:104, SEQ ID NO:105, SEQ ID NO:106, SEQ ID NO:107, SEQ ID NO:108, SEQ ID NO:109, SEQ ID NO:110, SEQ ID NO:111, SEQ ID NO:112, SEQ ID NO:113, SEQ ID NO:114, SEQ ID NO:115, SEQ ID NO:116, SEQ ID NO:117, SEQ ID NO:118, SEQ ID NO:119, SEQ ID NO:120, SEQ ID NO:121, SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, SEQ ID NO:132, SEQ ID NO:133, SEQ ID NO:134, SEQ ID NO:135, SEQ ID NO:136, SEQ ID NO:137, SEQ ID NO:138, SEQ ID NO:139, SEQ ID NO:140, SEQ ID NO:141, SEQ ID NO:142, SEQ ID NO:143, SEQ ID NO:144, SEQ ID NO:145, SEQ ID NO:146, SEQ ID NO:147, SEQ ID NO:148, SEQ ID NO:149, SEQ ID NO:150, SEQ ID NO:151, SEQ ID NO:152, SEQ ID NO:153, SEQ ID NO:154, SEQ ID NO:155, SEQ ID NO:156, SEQ ID NO:157, SEQ ID NO:158, SEQ ID NO:159, SEQ ID NO:160, SEQ ID NO:161, SEQ ID NO:162, SEQ ID NO:163, SEQ ID NO:164, SEQ ID NO:165, SEQ ID NO:166, SEQ ID NO:167, SEQ ID NO:168, SEQ ID NO:169, SEQ ID NO:170, SEQ ID NO:171, SEQ ID NO:172, SEQ ID NO:173, SEQ ID NO:174, SEQ ID NO:175, SEQ ID NO:176, SEQ ID

NO:177, SEQ ID NO:178, SEQ ID NO:179, SEQ ID NO:180, SEQ ID NO:181, SEQ ID NO:182, SEQ ID NO:183, SEQ ID NO:184, SEQ ID NO:185, SEQ ID NO:186, SEQ ID NO:187, SEQ ID NO:188, SEQ ID NO:189, SEQ ID NO:190, SEQ ID NO:191, SEQ ID NO:192, SEQ ID NO:193, SEQ ID NO:194, SEQ ID NO:195, SEQ ID NO:196, SEQ ID NO:197, SEQ ID NO:198, SEQ ID NO:199, SEQ ID NO:200, SEQ ID NO:201, SEQ ID NO:202, SEQ ID NO:203, SEQ ID NO:204, SEQ ID NO:205, SEQ ID NO:206, SEQ ID NO:207, SEQ ID NO:208, SEQ ID NO:209, SEQ ID NO:210, SEQ ID NO:211, SEQ ID NO:212, SEQ ID NO:213, SEQ ID NO:214, SEQ ID NO:215, SEQ ID NO:216, SEQ ID NO:217, SEQ ID NO:218, SEQ ID NO:219, SEQ ID NO:220, SEQ ID NO:221, SEQ ID NO:222, SEQ ID NO:223, SEQ ID NO:224, SEQ ID NO:225, SEQ ID NO:226, SEQ ID NO:227, SEQ ID NO:228, SEQ ID NO:229, SEQ ID NO:230, SEQ ID NO:231, SEQ ID NO:232, SEQ ID NO:233, SEQ ID NO:234, SEQ ID NO:235, SEQ ID NO:236, SEQ ID NO:237, SEQ ID NO:238, SEQ ID NO:239, SEQ ID NO:240, SEQ ID NO:241, SEQ ID NO:242, SEQ ID NO:243, SEQ ID NO:244, SEQ ID NO:245, SEQ ID NO:246, SEQ ID NO:247, SEQ ID NO:248, SEQ ID NO:249, SEQ ID NO:250, SEQ ID NO:251, SEQ ID NO:252, SEQ ID NO:253, SEQ ID NO:254, SEQ ID NO:255, SEQ ID NO:256, SEQ ID NO:257, SEQ ID NO:258, SEQ ID NO:259, SEQ ID NO:260, SEQ ID NO:261, SEQ ID NO:262, SEQ ID NO:263, SEQ ID NO:264, SEQ ID NO:265, SEQ ID NO:266, SEQ ID NO:267, SEQ ID NO:268, SEQ ID NO:269, SEQ ID NO:270, SEQ ID NO:271, SEQ ID NO:272, SEQ ID NO:273, SEQ ID NO:274, SEQ ID NO:275, SEQ ID NO:276, SEQ ID NO:277, SEQ ID NO:278, SEQ ID NO:279, SEQ ID NO:280, SEQ ID NO:281, SEQ ID NO:282, SEQ ID NO:283, SEQ ID NO:284, SEQ ID NO:285, SEQ ID NO:286, SEQ ID NO:287, SEQ ID NO:288, SEQ ID NO:289, SEQ ID NO:290, SEQ ID NO:291, SEQ ID NO:292, SEQ ID NO:293, SEQ ID NO:294, SEQ ID NO:295, SEQ ID NO:296, SEQ ID NO:297, SEQ ID NO:298, SEQ ID NO:299, SEQ ID NO:300, SEQ ID NO:301, SEQ ID NO:302, SEQ ID NO:303, SEQ ID NO:304, SEQ ID NO:305, SEQ ID NO:306, SEQ ID NO:307, SEQ ID NO:308, SEQ ID NO:309, SEQ ID NO:310, SEQ ID NO:311, SEQ ID NO:312, SEQ ID NO:313, SEQ ID NO:314, SEQ ID NO:315, SEQ ID NO:316, SEQ ID NO:317, SEQ ID NO:318, SEQ ID NO:319, SEQ ID NO:320, SEQ ID NO:321, SEQ ID NO:322, SEQ ID NO:323, SEQ ID NO:324, SEQ ID NO:325, SEQ ID NO:326, SEQ ID NO:327, SEQ ID NO:328, SEQ ID NO:329, SEQ ID NO:330, SEQ ID NO:331, SEQ ID NO:332, SEQ ID NO:333, SEQ ID NO:334, SEQ ID NO:335, SEQ ID NO:336, SEQ ID NO:337, SEQ ID NO:338, SEQ ID NO:339, SEQ ID NO:340, SEQ ID NO:341, SEQ ID NO:342, SEQ ID NO:343, SEQ ID NO:344, SEQ ID NO:345, SEQ ID NO:346, SEQ ID NO:347, SEQ ID NO:348, SEQ ID NO:349, SEQ ID NO:350, SEQ ID NO:351, SEQ ID NO:352, SEQ ID NO:353, SEQ ID NO:354, SEQ ID NO:355, SEQ ID NO:356, SEQ ID NO:357, SEQ ID NO:358, SEQ ID NO:359, SEQ ID NO:360, SEQ ID NO:361, SEQ ID

[illegible]

NO:547, SEQ ID NO:548, SEQ ID NO:549, SEQ ID NO:550, SEQ ID NO:551, SEQ ID NO:552, SEQ ID NO:553, SEQ ID NO:554, SEQ ID NO:555, SEQ ID NO:556, SEQ ID NO:557, SEQ ID NO:558, SEQ ID NO:559, SEQ ID NO:560, SEQ ID NO:561, SEQ ID NO:562, SEQ ID NO:563, SEQ ID NO:564, SEQ ID NO:565, SEQ ID NO:566, SEQ ID NO:567, SEQ ID NO:568, SEQ ID NO:569, SEQ ID NO:570, SEQ ID NO:571, SEQ ID NO:572, SEQ ID NO:573, SEQ ID NO:574, SEQ ID NO:575, SEQ ID NO:576, SEQ ID NO:577, SEQ ID NO:578, SEQ ID NO:579, SEQ ID NO:580, SEQ ID NO:581, SEQ ID NO:582, SEQ ID NO:583, SEQ ID NO:584, SEQ ID NO:585, SEQ ID NO:586, SEQ ID NO:587, SEQ ID NO:588, SEQ ID NO:589, SEQ ID NO:590, SEQ ID NO:591, SEQ ID NO:592, SEQ ID NO:593, SEQ ID NO:594, SEQ ID NO:595, SEQ ID NO:596, SEQ ID NO:597, SEQ ID NO:598, SEQ ID NO:599, SEQ ID NO:600, SEQ ID NO:601, SEQ ID NO:602, SEQ ID NO:603, SEQ ID NO:604, SEQ ID NO:605, SEQ ID NO:606, SEQ ID NO:607, SEQ ID NO:608, SEQ ID NO:609, SEQ ID NO:610, SEQ ID NO:611, SEQ ID NO:612, SEQ ID NO:613, SEQ ID NO:614, SEQ ID NO:615, SEQ ID NO:616, SEQ ID NO:617, SEQ ID NO:618, SEQ ID NO:619, SEQ ID NO:620, SEQ ID NO:621, SEQ ID NO:622, SEQ ID NO:623, SEQ ID NO:624, SEQ ID NO:625;

or to a complement of said sequence.

The invention also provides for proteins encoded by the above-described polynucleotides. In certain preferred embodiments, the polynucleotide is operably linked to an expression control sequence. The invention also provides a host cell, including bacterial, yeast, insect and mammalian cells, transformed with such polynucleotide compositions. Also provided by the present invention are organisms that have enhanced, reduced, or modified expression of the gene(s) corresponding to the polynucleotide sequences disclosed herein.

Processes are also provided for producing a protein, which comprise:

- (a) growing a culture of the host cell transformed with such polynucleotide compositions in a suitable culture medium; and
- (b) purifying the protein from the culture.

The protein produced according to such methods is also provided by the present invention.

Protein compositions of the present invention may further comprise a pharmaceutically acceptable carrier. Compositions comprising an antibody which specifically reacts with such protein are also provided by the present invention.

Methods are also provided for preventing, treating or ameliorating a medical condition which comprises administering to a mammalian subject a therapeutically effective amount of a composition comprising a protein of the present invention, and/or a polynucleotide of the present invention, and a pharmaceutically acceptable carrier.

DETAILED DESCRIPTION

The nucleotide sequences of the isolated cDNAs of the present invention are reported in the Sequence Listing below. Table 2 lists the "Clone ID Nos." assigned by applicants to each SEQ ID NO: in the Sequence Listing.

Table 2

Each pair of entries in this table consists of the SEQ ID NO (e.g., 1, 2, etc.) followed by the Clone ID No. for such sequence (e.g., YD123_1, YD124_1, etc.).

1	YD123_1	201	YD321_1	401	YE56_1	601	YH95_1
2	YD124_1	202	YD322_1	402	YE57_1	602	YH96_1
3	YD125_1	203	YD323_1	403	YE58_1	603	YH97_1
4	YD126_1	204	YD324_1	404	YE59_1	604	YH99_1
5	YD127_1	205	YD325_1	405	YE5_1	605	YH9_1
6	YD128_1	206	YD326_1	406	YE60_1	606	YHA2_1
7	YD129_1	207	YD327_1	407	YE61_1	607	YHA3_1
8	YD12_1	208	YD328_1	408	YE62_1	608	YHA4_1
9	YD130_1	209	YD329_1	409	YE63_1	609	YHA5_1
10	YD131_1	210	YD32_1	410	YE64_1	610	YHA6_1
11	YD132_1	211	YD330_1	411	YE65_1	611	YI101_1
12	YD133_1	212	YD331_1	412	YE66_1	612	YI102_1
13	YD134_1	213	YD332_1	413	YE67_1	613	YI103_1
14	YD135_1	214	YD333_1	414	YE68_1	614	YI104_1
15	YD136_1	215	YD334_1	415	YE69_1	615	YI106_1
16	YD138_1	216	YD335_1	416	YE6_1	616	YI107_1
17	YD139_1	217	YD336_1	417	YE70_1	617	YI108_1
18	YD13_1	218	YD337_1	418	YE71_1	618	YI109_1
19	YD140_1	219	YD338_1	419	YE73_1	619	YI10_1
20	YD142_1	220	YD339_1	420	YE74_1	620	YI110_1
21	YD143_1	221	YD33_1	421	YE75_1	621	YI111_1
22	YD144_1	222	YD340_1	422	YE76_1	622	YI112_1
23	YD146_1	223	YD341_1	423	YE77_1	623	YI113_1
24	YD147_1	224	YD342_1	424	YE79_1	624	YI114_1
25	YD148_1	225	YD343_1	425	YE80_1	625	YI115_1
26	YD149_1	226	YD344_1	426	YE81_1		

27	YD14_1	227	YD345_1	427	YE82_1
28	YD150_1	228	YD346_1	428	YE83_1
29	YD151_1	229	YD347_1	429	YE84_1
30	YD152_1	230	YD348_1	430	YE85_1
31	YD154_1	231	YD349_1	431	YE86_1
32	YD155_1	232	YD350_1	432	YE87_1
33	YD157_1	233	YD351_1	433	YE88_1
34	YD158_1	234	YD352_1	434	YE89_1
35	YD159_1	235	YD353_1	435	YE8_1
36	YD15_1	236	YD354_1	436	YE91_1
37	YD160_1	237	YD355_1	437	YE92_1
38	YD161_1	238	YD356_1	438	YE93_1
39	YD162_1	239	YD357_1	439	YE94_1
40	YD163_1	240	YD358_1	440	YE95_1
41	YD164_1	241	YD359_1	441	YE96_1
42	YD166_1	242	YD35_1	442	YE97_1
43	YD167_1	243	YD360_1	443	YE98_1
44	YD168_1	244	YD361_1	444	YE99_1
45	YD169_1	245	YD362_1	445	YE9_1
46	YD16_1	246	YD363_1	446	YEA2_1
47	YD170_1	247	YD364_1	447	YEA3_1
48	YD171_1	248	YD365_1	448	YF10_1
49	YD172_1	249	YD366_1	449	YF13_1
50	YD173_1	250	YD367_1	450	YF14_1
51	YD174_1	251	YD368_1	451	YF15_1
52	YD175_1	252	YD369_1	452	YF16_1
53	YD176_1	253	YD36_1	453	YF17_1
54	YD177_1	254	YD370_1	454	YF18_1
55	YD179_1	255	YD371_1	455	YF19_1
56	YD17_1	256	YD372_1	456	YF20_1
57	YD180_1	257	YD373_1	457	YF21_1
58	YD182_1	258	YD374_1	458	YF22_1
59	YD183_1	259	YD375_1	459	YF23_1
60	YD184_1	260	YD376_1	460	YF24_1
61	YD185_1	261	YD37_1	461	YF25_1
62	YD186_1	262	YD382_1	462	YF27_1
63	YD187_1	263	YD385_1	463	YF28_1

64	YD188_1	264	YD387_1	464	YF29_1
65	YD189_1	265	YD389_1	465	YF30_1
66	YD18_1	266	YD38_1	466	YF31_1
67	YD190_1	267	YD391_1	467	YF32_1
68	YD192_1	268	YD39_1	468	YF34_1
69	YD193_1	269	YD406_1	469	YF35_1
70	YD194_1	270	YD41_1	470	YF36_1
71	YD195_1	271	YD42_1	471	YF37_1
72	YD196_1	272	YD43_1	472	YF38_1
73	YD197_1	273	YD44_1	473	YF39_1
74	YD198_1	274	YD45_1	474	YF3_1
75	YD199_1	275	YD48_1	475	YF40_1
76	YD19_1	276	YD49_1	476	YF41_1
77	YD200_1	277	YD52_1	477	YF42_1
78	YD201_1	278	YD53_1	478	YF43_1
79	YD202_1	279	YD54_1	479	YF44_1
80	YD203_1	280	YD55_1	480	YF45_1
81	YD204_1	281	YD56_1	481	YF46_1
82	YD205_1	282	YD57_1	482	YF47_1
83	YD208_1	283	YD58_1	483	YF48_1
84	YD209_1	284	YD59_1	484	YF51_1
85	YD20_1	285	YD5_1	485	YF52_1
86	YD210_1	286	YD60_1	486	YF53_1
87	YD211_1	287	YD62_1	487	YF54_1
88	YD212_1	288	YD63_1	488	YF55_1
89	YD213_1	289	YD65_1	489	YF56_1
90	YD214_1	290	YD66_1	490	YF58_1
91	YD215_1	291	YD67_1	491	YF6_1
92	YD216_1	292	YD68_1	492	YF8_1
93	YD217_1	293	YD69_1	493	YFA1_1
94	YD219_1	294	YD6_1	494	YFA2_1
95	YD21_1	295	YD70_1	495	YFA3_1
96	YD221_1	296	YD71_1	496	YFA4_1
97	YD222_1	297	YD72_1	497	YFA5_1
98	YD223_1	298	YD74_1	498	YGA1_1
99	YD224_1	299	YD75_1	499	YGA2_1
100	YD225_1	300	YD76_1	500	YGA4_1

101	YD226_1	301	YD77_1	501	YH101_1
102	YD227_1	302	YD78_1	502	YH102_1
103	YD228_1	303	YD79_1	503	YH103_1
104	YD229_1	304	YD7_1	504	YH104_1
105	YD22_1	305	YD80_1	505	YH105_1
106	YD230_1	306	YD81_1	506	YH106_1
107	YD231_1	307	YD82_1	507	YH108_1
108	YD232_1	308	YD83_1	508	YH109_1
109	YD233_1	309	YD84_1	509	YH10_1
110	YD234_1	310	YD85_1	510	YH110_1
111	YD235_1	311	YD86_1	511	YH111_1
112	YD236_1	312	YD87_1	512	YH112_1
113	YD237_1	313	YD89_1	513	YH113_1
114	YD238_1	314	YD8_1	514	YH114_1
115	YD239_1	315	YD90_1	515	YH115_1
116	YD23_1	316	YD91_1	516	YH116_1
117	YD240_1	317	YD92_1	517	YH117_1
118	YD241_1	318	YD93_1	518	YH118_1
119	YD242_1	319	YD94_1	519	YH119_1
120	YD243_1	320	YD95_1	520	YH11_1
121	YD244_1	321	YD97_1	521	YH120_1
122	YD245_1	322	YD98_1	522	YH122_1
123	YD246_1	323	YD99_1	523	YH123_1
124	YD247_1	324	YD9_1	524	YH12_1
125	YD248_1	325	YDA10_1	525	YH13_1
126	YD249_1	326	YDA11_1	526	YH14_1
127	YD24_1	327	YDA12_1	527	YH15_1
128	YD250_1	328	YDA1_1	528	YH16_1
129	YD251_1	329	YDA2_1	529	YH17_1
130	YD252_1	330	YDA3_1	530	YH18_1
131	YD253_1	331	YDA4_1	531	YH19_1
132	YD254_1	332	YDA5_1	532	YH1_1
133	YD255_1	333	YDA6_1	533	YH21_1
134	YD256_1	334	YDA7_1	534	YH22_1
135	YD257_1	335	YE100_1	535	YH23_1
136	YD258_1	336	YE101_1	536	YH25_1
137	YD259_1	337	YE102_1	537	YH26_1

138	YD260_1	338	YE104_1	538	YH27_1
139	YD262_1	339	YE105_1	539	YH28_1
140	YD263_1	340	YE106_1	540	YH29_1
141	YD264_1	341	YE107_1	541	YH30_1
142	YD265_1	342	YE109_1	542	YH32_1
143	YD266_1	343	YE10_1	543	YH34_1
144	YD267_1	344	YE110_1	544	YH35_1
145	YD268_1	345	YE111_1	545	YH37_1
146	YD269_1	346	YE112_1	546	YH38_1
147	YD270_1	347	YE113_1	547	YH3_1
148	YD271_1	348	YE114_1	548	YH40_1
149	YD272_1	349	YE115_1	549	YH41_1
150	YD273_1	350	YE116_1	550	YH42_1
151	YD274_1	351	YE117_1	551	YH43_1
152	YD275_1	352	YE118_1	552	YH44_1
153	YD276_1	353	YE119_1	553	YH45_1
154	YD277_1	354	YE120_1	554	YH46_1
155	YD278_1	355	YE121_1	555	YH47_1
156	YD279_1	356	YE122_1	556	YH48_1
157	YD27_1	357	YE123_1	557	YH49_1
158	YD280_1	358	YE124_1	558	YH51_1
159	YD281_1	359	YE125_1	559	YH52_1
160	YD282_1	360	YE126_1	560	YH54_1
161	YD283_1	361	YE127_1	561	YH55_1
162	YD284_1	362	YE128_1	562	YH56_1
163	YD285_1	363	YE129_1	563	YH57_1
164	YD286_1	364	YE130_1	564	YH58_1
165	YD287_1	365	YE131_1	565	YH59_1
166	YD288_1	366	YE132_1	566	YH5_1
167	YD289_1	367	YE133_1	567	YH60_1
168	YD28_1	368	YE135_1	568	YH61_1
169	YD290_1	369	YE13_1	569	YH62_1
170	YD291_1	370	YE15_1	570	YH63_1
171	YD292_1	371	YE16_1	571	YH64_1
172	YD293_1	372	YE1_1	572	YH65_1
173	YD294_1	373	YE20_1	573	YH66_1
174	YD295_1	374	YE23_1	574	YH67_1

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175	YD296_1	375	YE24_1	575	YH68_1
176	YD297_1	376	YE26_1	576	YH6_1
177	YD298_1	377	YE27_1	577	YH70_1
178	YD299_1	378	YE28_1	578	YH72_1
179	YD300_1	379	YE29_1	579	YH73_1
180	YD301_1	380	YE31_1	580	YH74_1
181	YD302_1	381	YE32_1	581	YH75_1
182	YD303_1	382	YE33_1	582	YH76_1
183	YD304_1	383	YE34_1	583	YH77_1
184	YD305_1	384	YE35_1	584	YH78_1
185	YD306_1	385	YE36_1	585	YH79_1
186	YD307_1	386	YE37_1	586	YH7_1
187	YD308_1	387	YE38_1	587	YH80_1
188	YD309_1	388	YE3_1	588	YH82_1
189	YD30_1	389	YE41_1	589	YH83_1
190	YD310_1	390	YE42_1	590	YH84_1
191	YD311_1	391	YE44_1	591	YH85_1
192	YD312_1	392	YE45_1	592	YH86_1
193	YD313_1	393	YE46_1	593	YH87_1
194	YD314_1	394	YE48_1	594	YH88_1
195	YD315_1	395	YE49_1	595	YH8_1
196	YD316_1	396	YE50_1	596	YH90_1
197	YD317_1	397	YE51_1	597	YH91_1
198	YD318_1	398	YE52_1	598	YH92_1
199	YD319_1	399	YE54_1	599	YH93_1
200	YD320_1	400	YE55_1	600	YH94_1

The "Clone ID No." for a particular clone consists of one or two letters followed by a number. The letters designate the tissue source from which the cDNA for that clone was isolated, and these sources are listed in Table 3 below.

TABLE 3

Sel.	Species	Stage	Tissue	Cell Type	Treatment
YD	Human	Adult	Brain	N/A	None
YDA	Human	Adult	Tonsil	Inflamed	None
YE	Human	Fetal	Brain	19-23wks., M/F pool of 5	None
YEA	Human	Adult	Bladder	5637 carcinoma line	PMA + untreated
YF	Human	Fetal	Brain	19-23wks., M/F pool of 5	None

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YFA	Human	Adult	Retina	WERI-Rb1 retinoblastoma line	None
YGA	Human	Adult	Bladder	5637 carcinoma line	PMA + untreated
YH	Human	Mixed	Brain	Fetal and adult brain	None
YHA	Human	Adult	Kidney	293 carcinoma line	None
YI	Human	Adult	Brain	N/A	None

Table 3 Cell Type and Treatment Key:

PMA: phorbol myristate acetate

PMA + untreated: Pool of PMA-treated and untreated cells

Thus, the tissue source for a particular cDNA sequence can be identified in Table 3 by the one and two letter designations used in the relevant "Clone ID No." in Table 2. For example, a cDNA clone designated as "YD123_1" would have been isolated from a human adult brain library (i.e., selection "YD") as indicated in Table 3.

As used herein, "polynucleotide" includes single- and double-stranded RNAs, DNAs and RNA:DNA hybrids.

As used herein a "secreted" protein is one which, when expressed in a suitable host cell, is transported across or through a membrane, including transport as a result of signal sequences in its amino acid sequence. "Secreted" proteins include without limitation proteins secreted wholly (e.g., soluble proteins) or partially (e.g., receptors) from the cell in which they are expressed. "Secreted" proteins also include without limitation proteins which are transported across the membrane of the endoplasmic reticulum.

Fragments of the proteins of the present invention which are capable of exhibiting biological activity are also encompassed by the present invention. Fragments of the protein may be in linear form or they may be cyclized using known methods, for example, as described in H.U. Saragovi, *et al.*, Bio/Technology **10**, 773-778 (1992) and in R.S. McDowell, *et al.*, J. Amer. Chem. Soc. **114**, 9245-9253 (1992), both of which are incorporated herein by reference. Such fragments may be fused to carrier molecules such as immunoglobulins for many purposes, including increasing the valency of protein binding sites. For example, fragments of the protein may be fused through "linker" sequences to the Fc portion of an immunoglobulin. For a bivalent form of the protein, such a fusion could be to the Fc portion of an IgG molecule. Other immunoglobulin isotypes may also be used to generate such fusions. For example, a protein - IgM fusion would generate a decavalent form of the protein of the invention.

The present invention also provides both full-length and mature forms of the disclosed proteins. The full-length form of the such proteins is identified in the sequence listing by translation of the nucleotide sequence of each disclosed clone. The mature form(s) of such protein may be obtained by expression of the disclosed full-length polynucleotide

(preferably those deposited with ATCC) in a suitable mammalian cell or other host cell. The sequence(s) of the mature form(s) of the protein may also be determinable from the amino acid sequence of the full-length form.

The present invention also provides genes corresponding to the polynucleotide sequences disclosed herein. "Corresponding genes" are the regions of the genome that are transcribed to produce the mRNAs from which cDNA polynucleotide sequences are derived and may include contiguous regions of the genome necessary for the regulated expression of such genes. Corresponding genes may therefore include but are not limited to coding sequences, 5' and 3' untranslated regions, alternatively spliced exons, introns, promoters, enhancers, and silencer or suppressor elements. The corresponding genes can be isolated in accordance with known methods using the sequence information disclosed herein. Such methods include the preparation of probes or primers from the disclosed sequence information for identification and/or amplification of genes in appropriate genomic libraries or other sources of genomic materials. An "isolated gene" is a gene that has been separated from the adjacent coding sequences, if any, present in the genome of the organism from which the gene was isolated.

The chromosomal location corresponding to the polynucleotide sequences disclosed herein may also be determined, for example by hybridizing appropriately labeled polynucleotides of the present invention to chromosomes *in situ*. It may also be possible to determine the corresponding chromosomal location for a disclosed polynucleotide by identifying significantly similar nucleotide sequences in public databases, such as expressed sequence tags (ESTs), that have already been mapped to particular chromosomal locations. For at least some of the polynucleotide sequences disclosed herein, public database sequences having at least some similarity to the polynucleotide of the present invention have been listed by database accession number. Searches using the GenBank accession numbers of these public database sequences can then be performed at an Internet site provided by the National Center for Biotechnology Information having the address www.ncbi.nlm.nih.gov/UniGene, in order to identify "UniGene clusters" of overlapping sequences. Many of the "UniGene clusters" so identified will already have been mapped to particular chromosomal sites.

Organisms that have enhanced, reduced, or modified expression of the gene(s) corresponding to the polynucleotide sequences disclosed herein are provided. The desired change in gene expression can be achieved through the use of antisense polynucleotides or ribozymes that bind and/or cleave the mRNA transcribed from the gene (Albert and Morris, 1994, *Trends Pharmacol. Sci.* 15(7): 250-254; Lavarosky *et al.*, 1997, *Biochem. Mol. Med.* 62(1): 11-22; and Hampel, 1998, *Prog. Nucleic Acid Res. Mol. Biol.* 58: 1-39; all of which are incorporated by reference herein). Transgenic animals that have multiple copies of the

gene(s) corresponding to the polynucleotide sequences disclosed herein, preferably produced by transformation of cells with genetic constructs that are stably maintained within the transformed cells and their progeny, are provided. Transgenic animals that have modified genetic control regions that increase or reduce gene expression levels, or that change temporal or spatial patterns of gene expression, are also provided (see European Patent No. 0 649 464 B1, incorporated by reference herein). In addition, organisms are provided in which the gene(s) corresponding to the polynucleotide sequences disclosed herein have been partially or completely inactivated, through insertion of extraneous sequences into the corresponding gene(s) or through deletion of all or part of the corresponding gene(s). Partial or complete gene inactivation can be accomplished through insertion, preferably followed by imprecise excision, of transposable elements (Plasterk, 1992, *Bioessays* 14(9): 629-633; Zwaal *et al.*, 1993, *Proc. Natl. Acad. Sci. USA* 90(16): 7431-7435; Clark *et al.*, 1994, *Proc. Natl. Acad. Sci. USA* 91(2): 719-722; all of which are incorporated by reference herein), or through homologous recombination, preferably detected by positive/negative genetic selection strategies (Mansour *et al.*, 1988, *Nature* 336: 348-352; U.S. Patent Nos. 5,464,764; 5,487,992; 5,627,059; 5,631,153; 5,614,396; 5,616,491; and 5,679,523; all of which are incorporated by reference herein). These organisms with altered gene expression are preferably eukaryotes and more preferably are mammals. Such organisms are useful for the development of non-human models for the study of disorders involving the corresponding gene(s), and for the development of assay systems for the identification of molecules that interact with the protein product(s) of the corresponding gene(s).

Where the protein of the present invention is membrane-bound (e.g., is a receptor), the present invention also provides for soluble forms of such protein. In such forms part or all of the intracellular and transmembrane domains of the protein are deleted such that the protein is fully secreted from the cell in which it is expressed. The intracellular and transmembrane domains of proteins of the invention can be identified in accordance with known techniques for determination of such domains from sequence information.

Proteins and protein fragments of the present invention include proteins with amino acid sequence lengths that are at least 25% (more preferably at least 50%, and most preferably at least 75%) of the length of a disclosed protein and have at least 60% sequence identity (more preferably, at least 75% identity; most preferably at least 90% or 95% identity) with that disclosed protein, where sequence identity is determined by comparing the amino acid sequences of the proteins when aligned so as to maximize overlap and identity while minimizing sequence gaps. Also included in the present invention are proteins and protein fragments that contain a segment preferably comprising 8 or more (more preferably 20 or more, most preferably 30 or more) contiguous amino acids that shares at least 75% sequence

identity (more preferably, at least 85% identity; most preferably at least 95% identity) with any such segment of any of the disclosed proteins.

In particular, sequence identity may be determined using WU-BLAST (Washington University BLAST) version 2.0 software, which builds upon WU-BLAST version 1.4, which in turn is based on the public domain NCBI-BLAST version 1.4 (Altschul and Gish, 1996, Local alignment statistics, Doolittle *ed.*, *Methods in Enzymology* 266: 460-480; Altschul *et al.*, 1990, Basic local alignment search tool, *Journal of Molecular Biology* 215: 403-410; Gish and States, 1993, Identification of protein coding regions by database similarity search, *Nature Genetics* 3: 266-272; Karlin and Altschul, 1993, Applications and statistics for multiple high-scoring segments in molecular sequences, *Proc. Natl. Acad. Sci. USA* 90: 5873-5877; all of which are incorporated by reference herein). WU-BLAST version 2.0 executable programs for several UNIX platforms can be downloaded from the Internet file-transfer protocol (FTP) site <ftp://blast.wustl.edu/blast/executables>. The complete suite of search programs (BLASTP, BLASTN, BLASTX, TBLASTN, and TBLASTX) is provided at that site, in addition to several support programs. WU-BLAST 2.0 is copyrighted and may not be sold or redistributed in any form or manner without the express written consent of the author; but the posted executables may otherwise be freely used for commercial, nonprofit, or academic purposes. In all search programs in the suite -- BLASTP, BLASTN, BLASTX, TBLASTN and TBLASTX -- the gapped alignment routines are integral to the database search itself, and thus yield much better sensitivity and selectivity while producing the more easily interpreted output. Gapping can optionally be turned off in all of these programs, if desired. The default penalty (Q) for a gap of length one is Q=9 for proteins and BLASTP, and Q=10 for BLASTN, but may be changed to any integer value including zero, one through eight, nine, ten, eleven, twelve through twenty, twenty-one through fifty, fifty-one through one hundred, etc. The default per-residue penalty for extending a gap (R) is R=2 for proteins and BLASTP, and R=10 for BLASTN, but may be changed to any integer value including zero, one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve through twenty, twenty-one through fifty, fifty-one through one hundred, etc. Any combination of values for Q and R can be used in order to align sequences so as to maximize overlap and identity while minimizing sequence gaps. The default amino acid comparison matrix is BLOSUM62, but other amino acid comparison matrices such as PAM can be utilized.

Species homologues of the disclosed polynucleotides and proteins are also provided by the present invention. As used herein, a "species homologue" is a protein or polynucleotide with a different species of origin from that of a given protein or polynucleotide, but with significant sequence similarity to the given protein or polynucleotide. Preferably, polynucleotide species homologues have at least 60% sequence identity (more preferably, at least 75% identity; most preferably at least 90% identity) with

the given polynucleotide, and protein species homologues have at least 30% sequence identity (more preferably, at least 45% identity; most preferably at least 60% identity) with the given protein, where sequence identity is determined by comparing the nucleotide sequences of the polynucleotides or the amino acid sequences of the proteins when aligned so as to maximize overlap and identity while minimizing sequence gaps. Species homologues may be isolated and identified by making suitable probes or primers from the sequences provided herein and screening a suitable nucleic acid source from the desired species. Preferably, species homologues are those isolated from mammalian species. Most preferably, species homologues are those isolated from certain mammalian species such as, for example, *Pan troglodytes*, *Gorilla gorilla*, *Pongo pygmaeus*, *Hylobates concolor*, *Macaca mulatta*, *Papio papio*, *Papio hamadryas*, *Cercopithecus aethiops*, *Cebus capucinus*, *Aotus trivirgatus*, *Sanguinus oedipus*, *Microcebus murinus*, *Mus musculus*, *Rattus norvegicus*, *Cricetulus griseus*, *Felis catus*, *Mustela vison*, *Canis familiaris*, *Oryctolagus cuniculus*, *Bos taurus*, *Ovis aries*, *Sus scrofa*, and *Equus caballus*, for which genetic maps have been created allowing the identification of syntenic relationships between the genomic organization of genes in one species and the genomic organization of the related genes in another species (O'Brien and Seuánez, 1988, *Ann. Rev. Genet.* 22: 323-351; O'Brien *et al.*, 1993, *Nature Genetics* 3:103-112; Johansson *et al.*, 1995, *Genomics* 25: 682- 690; Lyons *et al.*, 1997, *Nature Genetics* 15: 47-56; O'Brien *et al.*, 1997, *Trends in Genetics* 13(10): 393-399; Carver and Stubbs, 1997, *Genome Research* 7:1123-1137; all of which are incorporated by reference herein).

The invention also encompasses allelic variants of the disclosed polynucleotides or proteins; that is, naturally-occurring alternative forms of the isolated polynucleotides which also encode proteins which are identical or have significantly similar sequences to those encoded by the disclosed polynucleotides. Preferably, allelic variants have at least 60% sequence identity (more preferably, at least 75% identity; most preferably at least 90% identity) with the given polynucleotide, where sequence identity is determined by comparing the nucleotide sequences of the polynucleotides when aligned so as to maximize overlap and identity while minimizing sequence gaps. Allelic variants may be isolated and identified by making suitable probes or primers from the sequences provided herein and screening a suitable nucleic acid source from individuals of the appropriate species.

The invention also includes polynucleotides with sequences complementary to those of the polynucleotides disclosed herein.

The present invention also includes polynucleotides that hybridize under reduced stringency conditions, more preferably stringent conditions, and most preferably highly stringent conditions, to polynucleotides described herein. Examples of stringency conditions are shown in the table below: highly stringent conditions are those that are at

least as stringent as, for example, conditions A-F; stringent conditions are at least as stringent as, for example, conditions G-L; and reduced stringency conditions are at least as stringent as, for example, conditions M-R.

Stringency Condition	Polynucleotide Hybrid	Hybrid Length (bp) [‡]	Hybridization Temperature and Buffert	Wash Temperature and Buffert
A	DNA:DNA	≥ 50	65°C; 1xSSC -or- 42°C; 1xSSC, 50% formamide	65°C; 0.3xSSC
B	DNA:DNA	<50	T _B [*] ; 1xSSC	T _B [*] ; 1xSSC
C	DNA:RNA	≥ 50	67°C; 1xSSC -or- 45°C; 1xSSC, 50% formamide	67°C; 0.3xSSC
D	DNA:RNA	<50	T _D [*] ; 1xSSC	T _D [*] ; 1xSSC
E	RNA:RNA	≥ 50	70°C; 1xSSC -or- 50°C; 1xSSC, 50% formamide	70°C; 0.3xSSC
F	RNA:RNA	<50	T _F [*] ; 1xSSC	T _F [*] ; 1xSSC
G	DNA:DNA	≥ 50	65°C; 4xSSC -or- 42°C; 4xSSC, 50% formamide	65°C; 1xSSC
H	DNA:DNA	<50	T _H [*] ; 4xSSC	T _H [*] ; 4xSSC
I	DNA:RNA	≥ 50	67°C; 4xSSC -or- 45°C; 4xSSC, 50% formamide	67°C; 1xSSC
J	DNA:RNA	<50	T _J [*] ; 4xSSC	T _J [*] ; 4xSSC
K	RNA:RNA	≥ 50	70°C; 4xSSC -or- 50°C; 4xSSC, 50% formamide	67°C; 1xSSC
L	RNA:RNA	<50	T _L [*] ; 2xSSC	T _L [*] ; 2xSSC
M	DNA:DNA	≥ 50	50°C; 4xSSC -or- 40°C; 6xSSC, 50% formamide	50°C; 2xSSC
N	DNA:DNA	<50	T _N [*] ; 6xSSC	T _N [*] ; 6xSSC
O	DNA:RNA	≥ 50	55°C; 4xSSC -or- 42°C; 6xSSC, 50% formamide	55°C; 2xSSC
P	DNA:RNA	<50	T _P [*] ; 6xSSC	T _P [*] ; 6xSSC
Q	RNA:RNA	≥ 50	60°C; 4xSSC -or- 45°C; 6xSSC, 50% formamide	60°C; 2xSSC
R	RNA:RNA	<50	T _R [*] ; 4xSSC	T _R [*] ; 4xSSC

[‡]: The hybrid length is that anticipated for the hybridized region(s) of the hybridizing polynucleotides. When hybridizing a polynucleotide to a target polynucleotide of unknown sequence, the hybrid length is assumed to be that of the hybridizing polynucleotide. When polynucleotides of known sequence are hybridized, the hybrid length can be determined by aligning the sequences of the polynucleotides and identifying the region or regions of optimal sequence complementarity.

[†]: SSPE (1xSSPE is 0.15M NaCl, 10mM NaH₂PO₄, and 1.25mM EDTA, pH 7.4) can be substituted for SSC (1xSSC is 0.15M NaCl and 15mM sodium citrate) in the hybridization and wash buffers; washes are performed for 15 minutes after hybridization is complete.

^{*}T_B - T_R: The hybridization temperature for hybrids anticipated to be less than 50 base pairs in length should be 5-10°C less than the melting temperature (T_m) of the hybrid, where T_m is determined according to the following equations. For hybrids less than 18 base pairs in length, T_m(°C) = 2(# of A + T bases) + 4(# of G + C bases). For hybrids between 18 and 49 base pairs in length, T_m(°C) = 81.5 + 16.6(log₁₀[Na⁺]) + 0.41(%G+C) - (600/N), where N is the number of bases in the hybrid, and [Na⁺] is the concentration of sodium ions in the hybridization buffer ([Na⁺] for 1xSSC = 0.165 M).

Additional examples of stringency conditions for polynucleotide hybridization are provided in Sambrook, J., E.F. Fritsch, and T. Maniatis, 1989, *Molecular Cloning: A Laboratory Manual*, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, chapters 9 and 11, and *Current Protocols in Molecular Biology*, 1995, F.M. Ausubel et al., eds., John Wiley & Sons, Inc., sections 2.10 and 6.3-6.4, incorporated herein by reference.

Preferably, each such hybridizing polynucleotide has a length that is at least 25% (more preferably at least 50%, and most preferably at least 75%) of the length of the polynucleotide of the present invention to which it hybridizes, and has at least 60% sequence identity (more preferably, at least 75% identity; most preferably at least 90% or 95% identity) with the polynucleotide of the present invention to which it hybridizes, where sequence identity is determined by comparing the sequences of the hybridizing polynucleotides when aligned so as to maximize overlap and identity while minimizing sequence gaps.

The isolated polynucleotide of the invention may contain sequences at its 5' and/or 3' end that are derived from linker, polylinker, or multiple cloning site sequences commonly found in vectors such as the pMT2 or pED expression vectors (see below). For example, sequences such as SEQ ID NO:626, SEQ ID NO:627, or SEQ ID NO:628 may be found at the 5' end of an isolated polynucleotide of the invention, or the complement of any of these sequences may be found at its 3' end. Similarly, sequences such as SEQ ID NO:629, SEQ ID NO:630, or SEQ ID NO:631 may be found at the 3' end of an isolated polynucleotide of the invention, or the complement of any of these sequences may be found at its 5' end. In addition, variants of these linker sequences may be present in isolated polynucleotides of the invention, which linker variants vary from SEQ ID NO:626 through SEQ ID NO:631 by the alteration, insertion, or deletion of one or more nucleotides. Therefore, a preferred embodiment of the invention comprises the nucleotide sequence of any of the isolated polynucleotides disclosed herein, beginning at nucleotide 25 and ending at nucleotide (N-25) of the SEQ ID NO for that polynucleotide, where N represents the total number of nucleotides in the sequence. As a specific example, a preferred embodiment of the invention comprises the nucleotide sequence of SEQ ID NO:1 from nucleotide 25 to nucleotide 802, where the total number of nucleotides (N) in SEQ ID NO:1 is 827, and N-25 equals 802. More preferably, a polynucleotide of the invention comprises the nucleotide sequence of any of the isolated polynucleotides disclosed herein, beginning at nucleotide 30 and ending at nucleotide (N-30) of the SEQ ID NO for that polynucleotide. Most preferably, a polynucleotide of the invention comprises the nucleotide sequence of any of the isolated polynucleotides disclosed herein, beginning at nucleotide 35 and ending at nucleotide (N-35) of the SEQ ID NO for that polynucleotide. Similarly, additional embodiments are those nucleotide sequences that extend from nucleotide 40 to nucleotide (N-40), or from nucleotide

45 to nucleotide (N-45), or from nucleotide 50 to nucleotide (N-50), or from nucleotide 60 to nucleotide (N-60), or from nucleotide 65 to nucleotide (N-65), or from nucleotide 70 to nucleotide (N-70), or from nucleotide 75 to nucleotide (N-75), or from nucleotide 80 to nucleotide (N-80), etc., for any of the polynucleotides disclosed herein. Further preferred embodiments are those nucleotide sequences that are subsequences of the nucleotide sequences disclosed herein, beginning at any nucleotide position selected from the group consisting of nucleotide 5, nucleotide 10, nucleotide 15, nucleotide 20, nucleotide 25, nucleotide 30, nucleotide 35, nucleotide 40, nucleotide 45, nucleotide 50, nucleotide 55, nucleotide 60, nucleotide 65, nucleotide 70, nucleotide 75, or nucleotide 80, and ending at any nucleotide position selected from the group consisting of nucleotide (N-5), nucleotide (N-10), nucleotide (N-15), nucleotide (N-20), nucleotide (N-25), nucleotide (N-30), nucleotide (N-35), nucleotide (N-40), nucleotide (N-45), nucleotide (N-50), nucleotide (N-55), nucleotide (N-60), nucleotide (N-65), nucleotide (N-70), nucleotide (N-75), or nucleotide (N-80), wherein N is the total number of nucleotides disclosed for a particular SEQ ID NO.

The isolated polynucleotide of the invention may be operably linked to an expression control sequence such as the pMT2 or pED expression vectors disclosed in Kaufman *et al.*, Nucleic Acids Res. 19, 4485-4490 (1991), in order to produce the protein recombinantly. Many suitable expression control sequences are known in the art. General methods of expressing recombinant proteins are also known and are exemplified in R. Kaufman, Methods in Enzymology 185, 537-566 (1990). As defined herein "operably linked" means that the isolated polynucleotide of the invention and an expression control sequence are situated within a vector or cell in such a way that the protein is expressed by a host cell which has been transformed (transfected) with the ligated polynucleotide/expression control sequence.

A number of types of cells may act as suitable host cells for expression of the protein. Mammalian host cells include, for example, monkey COS cells, Chinese Hamster Ovary (CHO) cells, human kidney 293 cells, human epidermal A431 cells, human Colo205 cells, 3T3 cells, CV-1 cells, other transformed primate cell lines, normal diploid cells, cell strains derived from in vitro culture of primary tissue, primary explants, HeLa cells, mouse L cells, BHK, HL-60, U937, HaK or Jurkat cells.

Alternatively, it may be possible to produce the protein in lower eukaryotes such as yeast or in prokaryotes such as bacteria. Potentially suitable yeast strains include *Saccharomyces cerevisiae*, *Schizosaccharomyces pombe*, *Kluyveromyces* strains, *Candida*, or any yeast strain capable of expressing heterologous proteins. Potentially suitable bacterial strains include *Escherichia coli*, *Bacillus subtilis*, *Salmonella typhimurium*, or any bacterial strain capable of expressing heterologous proteins. If the protein is made in yeast or bacteria, it may be necessary to modify the protein produced therein, for example by

phosphorylation or glycosylation of the appropriate sites, in order to obtain the functional protein. Such covalent attachments may be accomplished using known chemical or enzymatic methods.

The protein may also be produced by operably linking the isolated polynucleotide of the invention to suitable control sequences in one or more insect expression vectors, and employing an insect expression system. Materials and methods for baculovirus/insect cell expression systems are commercially available in kit form from, *e.g.*, Invitrogen, San Diego, California, U.S.A. (the MaxBac® kit), and such methods are well known in the art, as described in Summers and Smith, Texas Agricultural Experiment Station Bulletin No. 1555 (1987), incorporated herein by reference. As used herein, an insect cell capable of expressing a polynucleotide of the present invention is "transformed."

The protein of the invention may be prepared by culturing transformed host cells under culture conditions suitable to express the recombinant protein. The resulting expressed protein may then be purified from such culture (*i.e.*, from culture medium or cell extracts) using known purification processes, such as gel filtration and ion exchange chromatography. The purification of the protein may also include an affinity column containing agents which will bind to the protein; one or more column steps over such affinity resins as concanavalin A-agarose, heparin- toyopearl® or Cibacrom blue 3GA Sepharose®; one or more steps involving hydrophobic interaction chromatography using such resins as phenyl ether, butyl ether, or propyl ether; or immunoaffinity chromatography.

Alternatively, the protein of the invention may also be expressed in a form which will facilitate purification. For example, it may be expressed as a fusion protein, such as those of maltose binding protein (MBP), glutathione-S-transferase (GST) or thioredoxin (TRX). Kits for expression and purification of such fusion proteins are commercially available from New England BioLabs (Beverly, MA), Pharmacia (Piscataway, NJ) and Invitrogen Corporation (Carlsbad, CA), respectively. The protein can also be tagged with an epitope and subsequently purified by using a specific antibody directed to such epitope. One such epitope ("Flag") is commercially available from the Eastman Kodak Company (New Haven, CT).

Finally, one or more reverse-phase high performance liquid chromatography (RP-HPLC) steps employing hydrophobic RP-HPLC media, *e.g.*, silica gel having pendant methyl or other aliphatic groups, can be employed to further purify the protein. Some or all of the foregoing purification steps, in various combinations, can also be employed to provide a substantially homogeneous isolated recombinant protein. The protein thus purified is substantially free of other mammalian proteins and is defined in accordance with the present invention as an "isolated protein."

The protein of the invention may also be expressed as a product of transgenic animals, e.g., as a component of the milk of transgenic cows, goats, pigs, or sheep which are characterized by somatic or germ cells containing a nucleotide sequence encoding the protein.

The protein may also be produced by known conventional chemical synthesis. Methods for constructing the proteins of the present invention by synthetic means are known to those skilled in the art. The synthetically-constructed protein sequences, by virtue of sharing primary, secondary or tertiary structural and/or conformational characteristics with proteins may possess biological properties in common therewith, including protein activity. Thus, they may be employed as biologically active or immunological substitutes for natural, purified proteins in screening of therapeutic compounds and in immunological processes for the development of antibodies.

The proteins provided herein also include proteins characterized by amino acid sequences similar to those of purified proteins but into which modification are naturally provided or deliberately engineered. For example, modifications in the peptide or DNA sequences can be made by those skilled in the art using known techniques. Modifications of interest in the protein sequences may include the alteration, substitution, replacement, insertion or deletion of a selected amino acid residue in the coding sequence. For example, one or more of the cysteine residues may be deleted or replaced with another amino acid to alter the conformation of the molecule. Techniques for such alteration, substitution, replacement, insertion or deletion are well known to those skilled in the art (see, e.g., U.S. Patent No. 4,518,584). Preferably, such alteration, substitution, replacement, insertion or deletion retains the desired activity of the protein.

Other fragments and derivatives of the sequences of proteins which would be expected to retain protein activity in whole or in part and may thus be useful for screening or other immunological methodologies may also be easily made by those skilled in the art given the disclosures herein. Such modifications are believed to be encompassed by the present invention.

USES AND BIOLOGICAL ACTIVITY

The polynucleotides and proteins of the present invention are expected to exhibit one or more of the uses or biological activities (including those associated with assays cited herein) identified below. Uses or activities described for proteins of the present invention may be provided by administration or use of such proteins or by administration or use of polynucleotides encoding such proteins (such as, for example, in gene therapies or vectors suitable for introduction of DNA).

Research Uses and Utilities

The polynucleotides provided by the present invention can be used by the research community for various purposes. The primary use of polynucleotides of the invention which are sESTs is as probes for the identification and isolation of full-length cDNAs and genomic DNA molecules which correspond (i.e., is a longer polynucleotide sequence of which substantially the entire sEST is a fragment in the case of a full-length cDNA, or which encodes the sEST in the case of a genomic DNA molecule) to such sESTs. Techniques for use of such sequences as probes for larger cDNAs or genomic molecules are well known in the art.

The polynucleotides can also be used to express recombinant protein for analysis, characterization or therapeutic use; as markers for tissues in which the corresponding protein is preferentially expressed (either constitutively or at a particular stage of tissue differentiation or development or in disease states); as molecular weight markers on Southern gels; as chromosome markers or tags (when labeled) to identify chromosomes or to map related gene positions; to compare with endogenous DNA sequences in patients to identify potential genetic disorders; as probes to hybridize and thus discover novel, related DNA sequences; as a source of information to derive PCR primers for genetic fingerprinting; as a probe to "subtract-out" known sequences in the process of discovering other novel polynucleotides; for selecting and making oligomers for attachment to a "gene chip" or other support, including for examination of expression patterns; to raise anti-protein antibodies using DNA immunization techniques; and as an antigen to raise anti-DNA antibodies or elicit another immune response. Where the polynucleotide encodes a protein which binds or potentially binds to another protein (such as, for example, in a receptor-ligand interaction), the polynucleotide can also be used in interaction trap assays (such as, for example, that described in Gyuris et al., Cell 75:791-803 (1993)) to identify polynucleotides encoding the other protein with which binding occurs or to identify inhibitors of the binding interaction.

The proteins provided by the present invention can similarly be used in assay to determine biological activity, including in a panel of multiple proteins for high-throughput screening; to raise antibodies or to elicit another immune response; as a reagent (including the labeled reagent) in assays designed to quantitatively determine levels of the protein (or its receptor) in biological fluids; as markers for tissues in which the corresponding protein is preferentially expressed (either constitutively or at a particular stage of tissue differentiation or development or in a disease state); and, of course, to isolate correlative receptors or ligands. Where the protein binds or potentially binds to another protein (such as, for example, in a receptor-ligand interaction), the protein can be used to identify the other protein with which binding occurs or to identify inhibitors of the binding interaction.

Proteins involved in these binding interactions can also be used to screen for peptide or small molecule inhibitors or agonists of the binding interaction.

Any or all of these research utilities are capable of being developed into reagent grade or kit format for commercialization as research products.

Methods for performing the uses listed above are well known to those skilled in the art. References disclosing such methods include without limitation "Molecular Cloning: A Laboratory Manual", 2d ed., Cold Spring Harbor Laboratory Press, Sambrook, J., E.F. Fritsch and T. Maniatis eds., 1989, and "Methods in Enzymology: Guide to Molecular Cloning Techniques", Academic Press, Berger, S.L. and A.R. Kimmel eds., 1987.

Nutritional Uses

Polynucleotides and proteins of the present invention can also be used as nutritional sources or supplements. Such uses include without limitation use as a protein or amino acid supplement, use as a carbon source, use as a nitrogen source and use as a source of carbohydrate. In such cases the protein or polynucleotide of the invention can be added to the feed of a particular organism or can be administered as a separate solid or liquid preparation, such as in the form of powder, pills, solutions, suspensions or capsules. In the case of microorganisms, the protein or polynucleotide of the invention can be added to the medium in or on which the microorganism is cultured.

Cytokine and Cell Proliferation/Differentiation Activity

A protein of the present invention may exhibit cytokine, cell proliferation (either inducing or inhibiting) or cell differentiation (either inducing or inhibiting) activity or may induce production of other cytokines in certain cell populations. Many protein factors discovered to date, including all known cytokines, have exhibited activity in one or more factor dependent cell proliferation assays, and hence the assays serve as a convenient confirmation of cytokine activity. The activity of a protein of the present invention is evidenced by any one of a number of routine factor dependent cell proliferation assays for cell lines including, without limitation, 32D, DA2, DA1G, T10, B9, B9/11, BaF3, MC9/G, M+ (preB M+), 2E8, RB5, DA1, 123, T1165, HT2, CTLL2, TF-1, Mo7e and CMK.

The activity of a protein of the invention may, among other means, be measured by the following methods:

Assays for T-cell or thymocyte proliferation include without limitation those described in: Current Protocols in Immunology, Ed by J. E. Coligan, A.M. Kruisbeek, D.H. Margulies, E.M. Shevach, W Strober, Pub. Greene Publishing Associates and Wiley-Interscience (Chapter 3, In Vitro assays for Mouse Lymphocyte Function 3.1- 3.19; Chapter 7, Immunologic studies in Humans); Takai et al., J. Immunol. 137:3494-3500, 1986; Bertagnolli

et al., J. Immunol. 145:1706-1712, 1990; Bertagnolli et al., Cellular Immunology 133:327-341, 1991; Bertagnolli, et al., J. Immunol. 149:3778-3783, 1992; Bowman et al., J. Immunol. 152: 1756-1761, 1994.

Assays for cytokine production and/or proliferation of spleen cells, lymph node cells or thymocytes include, without limitation, those described in: Polyclonal T cell stimulation, Kruisbeek, A.M. and Shevach, E.M. In *Current Protocols in Immunology*. J.E.e.a. Coligan eds. Vol 1 pp. 3.12.1-3.12.14, John Wiley and Sons, Toronto. 1994; and Measurement of mouse and human Interferon γ , Schreiber, R.D. In *Current Protocols in Immunology*. J.E.e.a. Coligan eds. Vol 1 pp. 6.8.1-6.8.8, John Wiley and Sons, Toronto. 1994.

Assays for proliferation and differentiation of hematopoietic and lymphopoietic cells include, without limitation, those described in: Measurement of Human and Murine Interleukin 2 and Interleukin 4, Bottomly, K., Davis, L.S. and Lipsky, P.E. In *Current Protocols in Immunology*. J.E.e.a. Coligan eds. Vol 1 pp. 6.3.1-6.3.12, John Wiley and Sons, Toronto. 1991; deVries et al., J. Exp. Med. 173:1205-1211, 1991; Moreau et al., Nature 336:690-692, 1988; Greenberger et al., Proc. Natl. Acad. Sci. U.S.A. 80:2931-2938, 1983; Measurement of mouse and human interleukin 6 - Nordan, R. In *Current Protocols in Immunology*. J.E.e.a. Coligan eds. Vol 1 pp. 6.6.1-6.6.5, John Wiley and Sons, Toronto. 1991; Smith et al., Proc. Natl. Acad. Sci. U.S.A. 83:1857-1861, 1986; Measurement of human Interleukin 11 - Bennett, F., Giannotti, J., Clark, S.C. and Turner, K. J. In *Current Protocols in Immunology*. J.E.e.a. Coligan eds. Vol 1 pp. 6.15.1 John Wiley and Sons, Toronto. 1991; Measurement of mouse and human Interleukin 9 - Ciarletta, A., Giannotti, J., Clark, S.C. and Turner, K.J. In *Current Protocols in Immunology*. J.E.e.a. Coligan eds. Vol 1 pp. 6.13.1, John Wiley and Sons, Toronto. 1991.

Assays for T-cell clone responses to antigens (which will identify, among others, proteins that affect APC-T cell interactions as well as direct T-cell effects by measuring proliferation and cytokine production) include, without limitation, those described in: *Current Protocols in Immunology*, Ed by J. E. Coligan, A.M. Kruisbeek, D.H. Margulies, E.M. Shevach, W Strober, Pub. Greene Publishing Associates and Wiley-Interscience (Chapter 3, In Vitro assays for Mouse Lymphocyte Function; Chapter 6, Cytokines and their cellular receptors; Chapter 7, Immunologic studies in Humans); Weinberger et al., Proc. Natl. Acad. Sci. USA 77:6091-6095, 1980; Weinberger et al., Eur. J. Immun. 11:405-411, 1981; Takai et al., J. Immunol. 137:3494-3500, 1986; Takai et al., J. Immunol. 140:508-512, 1988.

Immune Stimulating or Suppressing Activity

A protein of the present invention may also exhibit immune stimulating or immune suppressing activity, including without limitation the activities for which assays are described herein. A protein may be useful in the treatment of various immune deficiencies

and disorders (including severe combined immunodeficiency (SCID)), e.g., in regulating (up or down) growth and proliferation of T and/or B lymphocytes, as well as effecting the cytolytic activity of NK cells and other cell populations. These immune deficiencies may be genetic or be caused by viral (e.g., HIV) as well as bacterial or fungal infections, or may result from autoimmune disorders. More specifically, infectious diseases caused by viral, bacterial, fungal or other infection may be treatable using a protein of the present invention, including infections by HIV, hepatitis viruses, herpesviruses, mycobacteria, *Leishmania* spp., malaria spp. and various fungal infections such as candidiasis. Of course, in this regard, a protein of the present invention may also be useful where a boost to the immune system generally may be desirable, *i.e.*, in the treatment of cancer.

Autoimmune disorders which may be treated using a protein of the present invention include, for example, connective tissue disease, multiple sclerosis, systemic lupus erythematosus, rheumatoid arthritis, autoimmune pulmonary inflammation, Guillain-Barre syndrome, autoimmune thyroiditis, insulin dependent diabetes mellitus, myasthenia gravis, graft-versus-host disease and autoimmune inflammatory eye disease. Such a protein of the present invention may also be useful in the treatment of allergic reactions and conditions, such as asthma (particularly allergic asthma) or other respiratory problems. Other conditions, in which immune suppression is desired (including, for example, organ transplantation), may also be treatable using a protein of the present invention.

Using the proteins of the invention it may also be possible to immune responses, in a number of ways. Down regulation may be in the form of inhibiting or blocking an immune response already in progress or may involve preventing the induction of an immune response. The functions of activated T cells may be inhibited by suppressing T cell responses or by inducing specific tolerance in T cells, or both. Immunosuppression of T cell responses is generally an active, non-antigen-specific, process which requires continuous exposure of the T cells to the suppressive agent. Tolerance, which involves inducing non-responsiveness or anergy in T cells, is distinguishable from immunosuppression in that it is generally antigen-specific and persists after exposure to the tolerizing agent has ceased. Operationally, tolerance can be demonstrated by the lack of a T cell response upon reexposure to specific antigen in the absence of the tolerizing agent.

Down regulating or preventing one or more antigen functions (including without limitation B lymphocyte antigen functions (such as, for example, B7)), e.g., preventing high level lymphokine synthesis by activated T cells, will be useful in situations of tissue, skin and organ transplantation and in graft-versus-host disease (GVHD). For example, blockage of T cell function should result in reduced tissue destruction in tissue transplantation. Typically, in tissue transplants, rejection of the transplant is initiated through its recognition as foreign by T cells, followed by an immune reaction that destroys the transplant. The

administration of a molecule which inhibits or blocks interaction of a B7 lymphocyte antigen with its natural ligand(s) on immune cells (such as a soluble, monomeric form of a peptide having B7-2 activity alone or in conjunction with a monomeric form of a peptide having an activity of another B lymphocyte antigen (*e.g.*, B7-1, B7-3) or blocking antibody), prior to transplantation can lead to the binding of the molecule to the natural ligand(s) on the immune cells without transmitting the corresponding costimulatory signal. Blocking B lymphocyte antigen function in this manner prevents cytokine synthesis by immune cells, such as T cells, and thus acts as an immunosuppressant. Moreover, the lack of costimulation may also be sufficient to anergize the T cells, thereby inducing tolerance in a subject. Induction of long-term tolerance by B lymphocyte antigen-blocking reagents may avoid the necessity of repeated administration of these blocking reagents. To achieve sufficient immunosuppression or tolerance in a subject, it may also be necessary to block the function of a combination of B lymphocyte antigens.

The efficacy of particular blocking reagents in preventing organ transplant rejection or GVHD can be assessed using animal models that are predictive of efficacy in humans. Examples of appropriate systems which can be used include allogeneic cardiac grafts in rats and xenogeneic pancreatic islet cell grafts in mice, both of which have been used to examine the immunosuppressive effects of CTLA4Ig fusion proteins *in vivo* as described in Lenschow *et al.*, *Science* 257:789-792 (1992) and Turka *et al.*, *Proc. Natl. Acad. Sci USA*, 89:11102-11105 (1992). In addition, murine models of GVHD (see Paul ed., *Fundamental Immunology*, Raven Press, New York, 1989, pp. 846-847) can be used to determine the effect of blocking B lymphocyte antigen function *in vivo* on the development of that disease.

Blocking antigen function may also be therapeutically useful for treating autoimmune diseases. Many autoimmune disorders are the result of inappropriate activation of T cells that are reactive against self tissue and which promote the production of cytokines and autoantibodies involved in the pathology of the diseases. Preventing the activation of autoreactive T cells may reduce or eliminate disease symptoms.

Administration of reagents which block costimulation of T cells by disrupting receptor:ligand interactions of B lymphocyte antigens can be used to inhibit T cell activation and prevent production of autoantibodies or T cell-derived cytokines which may be involved in the disease process. Additionally, blocking reagents may induce antigen-specific tolerance of autoreactive T cells which could lead to long-term relief from the disease. The efficacy of blocking reagents in preventing or alleviating autoimmune disorders can be determined using a number of well-characterized animal models of human autoimmune diseases. Examples include murine experimental autoimmune encephalitis, systemic lupus erythematosus in MRL/*lpr/lpr* mice or NZB hybrid mice, murine autoimmune collagen arthritis, diabetes mellitus in NOD mice and BB rats, and murine

experimental myasthenia gravis (see Paul ed., Fundamental Immunology, Raven Press, New York, 1989, pp. 840-856).

Upregulation of an antigen function (preferably a B lymphocyte antigen function), as a means of up regulating immune responses, may also be useful in therapy. Upregulation of immune responses may be in the form of enhancing an existing immune response or eliciting an initial immune response. For example, enhancing an immune response through stimulating B lymphocyte antigen function may be useful in cases of viral infection. In addition, systemic viral diseases such as influenza, the common cold, and encephalitis might be alleviated by the administration of stimulatory forms of B lymphocyte antigens systemically.

Alternatively, anti-viral immune responses may be enhanced in an infected patient by removing T cells from the patient, costimulating the T cells *in vitro* with viral antigen-pulsed APCs either expressing a peptide of the present invention or together with a stimulatory form of a soluble peptide of the present invention and reintroducing the *in vitro* activated T cells into the patient. Another method of enhancing anti-viral immune responses would be to isolate infected cells from a patient, transfect them with a nucleic acid encoding a protein of the present invention as described herein such that the cells express all or a portion of the protein on their surface, and reintroduce the transfected cells into the patient. The infected cells would now be capable of delivering a costimulatory signal to, and thereby activate, T cells *in vivo*.

In another application, up regulation or enhancement of antigen function (preferably B lymphocyte antigen function) may be useful in the induction of tumor immunity. Tumor cells (*e.g.*, sarcoma, melanoma, lymphoma, leukemia, neuroblastoma, carcinoma) transfected with a nucleic acid encoding at least one peptide of the present invention can be administered to a subject to overcome tumor-specific tolerance in the subject. If desired, the tumor cell can be transfected to express a combination of peptides. For example, tumor cells obtained from a patient can be transfected *ex vivo* with an expression vector directing the expression of a peptide having B7-2-like activity alone, or in conjunction with a peptide having B7-1-like activity and/or B7-3-like activity. The transfected tumor cells are returned to the patient to result in expression of the peptides on the surface of the transfected cell. Alternatively, gene therapy techniques can be used to target a tumor cell for transfection *in vivo*.

The presence of the peptide of the present invention having the activity of a B lymphocyte antigen(s) on the surface of the tumor cell provides the necessary costimulation signal to T cells to induce a T cell mediated immune response against the transfected tumor cells. In addition, tumor cells which lack MHC class I or MHC class II molecules, or which fail to reexpress sufficient amounts of MHC class I or MHC class II molecules, can be

transfected with nucleic acid encoding all or a portion of (*e.g.*, a cytoplasmic-domain truncated portion) of an MHC class I α chain protein and β_2 microglobulin protein or an MHC class II α chain protein and an MHC class II β chain protein to thereby express MHC class I or MHC class II proteins on the cell surface. Expression of the appropriate class I or class II MHC in conjunction with a peptide having the activity of a B lymphocyte antigen (*e.g.*, B7-1, B7-2, B7-3) induces a T cell mediated immune response against the transfected tumor cell. Optionally, a gene encoding an antisense construct which blocks expression of an MHC class II associated protein, such as the invariant chain, can also be cotransfected with a DNA encoding a peptide having the activity of a B lymphocyte antigen to promote presentation of tumor associated antigens and induce tumor specific immunity. Thus, the induction of a T cell mediated immune response in a human subject may be sufficient to overcome tumor-specific tolerance in the subject.

The activity of a protein of the invention may, among other means, be measured by the following methods:

Suitable assays for thymocyte or splenocyte cytotoxicity include, without limitation, those described in: *Current Protocols in Immunology*, Ed by J. E. Coligan, A.M. Kruisbeek, D.H. Margulies, E.M. Shevach, W Strober, Pub. Greene Publishing Associates and Wiley-Interscience (Chapter 3, *In Vitro* assays for Mouse Lymphocyte Function 3.1-3.19; Chapter 7, *Immunologic studies in Humans*); Herrmann et al., *Proc. Natl. Acad. Sci. USA* 78:2488-2492, 1981; Herrmann et al., *J. Immunol.* 128:1968-1974, 1982; Handa et al., *J. Immunol.* 135:1564-1572, 1985; Takai et al., *J. Immunol.* 137:3494-3500, 1986; Takai et al., *J. Immunol.* 140:508-512, 1988; Herrmann et al., *Proc. Natl. Acad. Sci. USA* 78:2488-2492, 1981; Herrmann et al., *J. Immunol.* 128:1968-1974, 1982; Handa et al., *J. Immunol.* 135:1564-1572, 1985; Takai et al., *J. Immunol.* 137:3494-3500, 1986; Bowman et al., *J. Virology* 61:1992-1998; Takai et al., *J. Immunol.* 140:508-512, 1988; Bertagnoli et al., *Cellular Immunology* 133:327-341, 1991; Brown et al., *J. Immunol.* 153:3079-3092, 1994.

Assays for T-cell-dependent immunoglobulin responses and isotype switching (which will identify, among others, proteins that modulate T-cell dependent antibody responses and that affect Th1/Th2 profiles) include, without limitation, those described in: Maliszewski, *J. Immunol.* 144:3028-3033, 1990; and *Assays for B cell function: In vitro* antibody production, Mond, J.J. and Brunswick, M. In *Current Protocols in Immunology*. J.E.e.a. Coligan eds. Vol 1 pp. 3.8.1-3.8.16, John Wiley and Sons, Toronto. 1994.

Mixed lymphocyte reaction (MLR) assays (which will identify, among others, proteins that generate predominantly Th1 and CTL responses) include, without limitation, those described in: *Current Protocols in Immunology*, Ed by J. E. Coligan, A.M. Kruisbeek, D.H. Margulies, E.M. Shevach, W Strober, Pub. Greene Publishing Associates and Wiley-Interscience (Chapter 3, *In Vitro* assays for Mouse Lymphocyte Function 3.1-3.19; Chapter 7,

Immunologic studies in Humans); Takai et al., J. Immunol. 137:3494-3500, 1986; Takai et al., J. Immunol. 140:508-512, 1988; Bertagnolli et al., J. Immunol. 149:3778-3783, 1992.

Dendritic cell-dependent assays (which will identify, among others, proteins expressed by dendritic cells that activate naive T-cells) include, without limitation, those described in: Guery et al., J. Immunol. 134:536-544, 1995; Inaba et al., Journal of Experimental Medicine 173:549-559, 1991; Macatonia et al., Journal of Immunology 154:5071-5079, 1995; Porgador et al., Journal of Experimental Medicine 182:255-260, 1995; Nair et al., Journal of Virology 67:4062-4069, 1993; Huang et al., Science 264:961-965, 1994; Macatonia et al., Journal of Experimental Medicine 169:1255-1264, 1989; Bhardwaj et al., Journal of Clinical Investigation 94:797-807, 1994; and Inaba et al., Journal of Experimental Medicine 172:631-640, 1990.

Assays for lymphocyte survival/apoptosis (which will identify, among others, proteins that prevent apoptosis after superantigen induction and proteins that regulate lymphocyte homeostasis) include, without limitation, those described in: Darzynkiewicz et al., Cytometry 13:795-808, 1992; Gorczyca et al., Leukemia 7:659-670, 1993; Gorczyca et al., Cancer Research 53:1945-1951, 1993; Itoh et al., Cell 66:233-243, 1991; Zacharchuk, Journal of Immunology 145:4037-4045, 1990; Zamai et al., Cytometry 14:891-897, 1993; Gorczyca et al., International Journal of Oncology 1:639-648, 1992.

Assays for proteins that influence early steps of T-cell commitment and development include, without limitation, those described in: Antica et al., Blood 84:111-117, 1994; Fine et al., Cellular Immunology 155:111-122, 1994; Galy et al., Blood 85:2770-2778, 1995; Toki et al., Proc. Nat. Acad Sci. USA 88:7548-7551, 1991.

Hematopoiesis Regulating Activity

A protein of the present invention may be useful in regulation of hematopoiesis and, consequently, in the treatment of myeloid or lymphoid cell deficiencies. Even marginal biological activity in support of colony forming cells or of factor-dependent cell lines indicates involvement in regulating hematopoiesis, e.g. in supporting the growth and proliferation of erythroid progenitor cells alone or in combination with other cytokines, thereby indicating utility, for example, in treating various anemias or for use in conjunction with irradiation/chemotherapy to stimulate the production of erythroid precursors and/or erythroid cells; in supporting the growth and proliferation of myeloid cells such as granulocytes and monocytes/macrophages (i.e., traditional CSF activity) useful, for example, in conjunction with chemotherapy to prevent or treat consequent myelo-suppression; in supporting the growth and proliferation of megakaryocytes and consequently of platelets thereby allowing prevention or treatment of various platelet disorders such as thrombocytopenia, and generally for use in place of or complimentary to

platelet transfusions; and/or in supporting the growth and proliferation of hematopoietic stem cells which are capable of maturing to any and all of the above-mentioned hematopoietic cells and therefore find therapeutic utility in various stem cell disorders (such as those usually treated with transplantation, including, without limitation, aplastic anemia and paroxysmal nocturnal hemoglobinuria), as well as in repopulating the stem cell compartment post irradiation/chemotherapy, either *in-vivo* or *ex-vivo* (i.e., in conjunction with bone marrow transplantation or with peripheral progenitor cell transplantation (homologous or heterologous)) as normal cells or genetically manipulated for gene therapy.

The activity of a protein of the invention may, among other means, be measured by the following methods:

Suitable assays for proliferation and differentiation of various hematopoietic lines are cited above.

Assays for embryonic stem cell differentiation (which will identify, among others, proteins that influence embryonic differentiation hematopoiesis) include, without limitation, those described in: Johansson et al. *Cellular Biology* 15:141-151, 1995; Keller et al., *Molecular and Cellular Biology* 13:473-486, 1993; McClanahan et al., *Blood* 81:2903-2915, 1993.

Assays for stem cell survival and differentiation (which will identify, among others, proteins that regulate lympho-hematopoiesis) include, without limitation, those described in: Methylcellulose colony forming assays, Freshney, M.G. In *Culture of Hematopoietic Cells*. R.I. Freshney, et al. eds. Vol pp. 265-268, Wiley-Liss, Inc., New York, NY. 1994; Hirayama et al., *Proc. Natl. Acad. Sci. USA* 89:5907-5911, 1992; Primitive hematopoietic colony forming cells with high proliferative potential, McNiece, I.K. and Briddell, R.A. In *Culture of Hematopoietic Cells*. R.I. Freshney, et al. eds. Vol pp. 23-39, Wiley-Liss, Inc., New York, NY. 1994; Neben et al., *Experimental Hematology* 22:353-359, 1994; Cobblestone area forming cell assay, Ploemacher, R.E. In *Culture of Hematopoietic Cells*. R.I. Freshney, et al. eds. Vol pp. 1-21, Wiley-Liss, Inc., New York, NY. 1994; Long term bone marrow cultures in the presence of stromal cells, Spooncer, E., Dexter, M. and Allen, T. In *Culture of Hematopoietic Cells*. R.I. Freshney, et al. eds. Vol pp. 163-179, Wiley-Liss, Inc., New York, NY. 1994; Long term culture initiating cell assay, Sutherland, H.J. In *Culture of Hematopoietic Cells*. R.I. Freshney, et al. eds. Vol pp. 139-162, Wiley-Liss, Inc., New York, NY. 1994.

Tissue Growth Activity

A protein of the present invention also may have utility in compositions used for bone, cartilage, tendon, ligament and/or nerve tissue growth or regeneration, as well as for wound healing and tissue repair and replacement, and in the treatment of burns, incisions and ulcers.

A protein of the present invention, which induces cartilage and/or bone growth in circumstances where bone is not normally formed, has application in the healing of bone fractures and cartilage damage or defects in humans and other animals. Such a preparation employing a protein of the invention may have prophylactic use in closed as well as open fracture reduction and also in the improved fixation of artificial joints. *De novo* bone formation induced by an osteogenic agent contributes to the repair of congenital, trauma induced, or oncologic resection induced craniofacial defects, and also is useful in cosmetic plastic surgery.

A protein of this invention may also be used in the treatment of periodontal disease, and in other tooth repair processes. Such agents may provide an environment to attract bone-forming cells, stimulate growth of bone-forming cells or induce differentiation of progenitors of bone-forming cells. A protein of the invention may also be useful in the treatment of osteoporosis or osteoarthritis, such as through stimulation of bone and/or cartilage repair or by blocking inflammation or processes of tissue destruction (collagenase activity, osteoclast activity, etc.) mediated by inflammatory processes.

Another category of tissue regeneration activity that may be attributable to the protein of the present invention is tendon/ligament formation. A protein of the present invention, which induces tendon/ligament-like tissue or other tissue formation in circumstances where such tissue is not normally formed, has application in the healing of tendon or ligament tears, deformities and other tendon or ligament defects in humans and other animals. Such a preparation employing a tendon/ligament-like tissue inducing protein may have prophylactic use in preventing damage to tendon or ligament tissue, as well as use in the improved fixation of tendon or ligament to bone or other tissues, and in repairing defects to tendon or ligament tissue. *De novo* tendon/ligament-like tissue formation induced by a composition of the present invention contributes to the repair of congenital, trauma induced, or other tendon or ligament defects of other origin, and is also useful in cosmetic plastic surgery for attachment or repair of tendons or ligaments. The compositions of the present invention may provide an environment to attract tendon- or ligament-forming cells, stimulate growth of tendon- or ligament-forming cells, induce differentiation of progenitors of tendon- or ligament-forming cells, or induce growth of tendon/ligament cells or progenitors *ex vivo* for return *in vivo* to effect tissue repair. The compositions of the invention may also be useful in the treatment of tendinitis, carpal tunnel syndrome and other tendon or ligament defects. The compositions may also include an appropriate matrix and/or sequestering agent as a carrier as is well known in the art.

The protein of the present invention may also be useful for proliferation of neural cells and for regeneration of nerve and brain tissue, *i.e.* for the treatment of central and peripheral nervous system diseases and neuropathies, as well as mechanical and traumatic

disorders, which involve degeneration, death or trauma to neural cells or nerve tissue. More specifically, a protein may be used in the treatment of diseases of the peripheral nervous system, such as peripheral nerve injuries, peripheral neuropathy and localized neuropathies, and central nervous system diseases, such as Alzheimer's, Parkinson's disease, Huntington's disease, amyotrophic lateral sclerosis, and Shy-Drager syndrome. Further conditions which may be treated in accordance with the present invention include mechanical and traumatic disorders, such as spinal cord disorders, head trauma and cerebrovascular diseases such as stroke. Peripheral neuropathies resulting from chemotherapy or other medical therapies may also be treatable using a protein of the invention.

Proteins of the invention may also be useful to promote better or faster closure of non-healing wounds, including without limitation pressure ulcers, ulcers associated with vascular insufficiency, surgical and traumatic wounds, and the like.

It is expected that a protein of the present invention may also exhibit activity for generation or regeneration of other tissues, such as organs (including, for example, pancreas, liver, intestine, kidney, skin, endothelium), muscle (smooth, skeletal or cardiac) and vascular (including vascular endothelium) tissue, or for promoting the growth of cells comprising such tissues. Part of the desired effects may be by inhibition or modulation of fibrotic scarring to allow normal tissue to regenerate. A protein of the invention may also exhibit angiogenic activity.

A protein of the present invention may also be useful for gut protection or regeneration and treatment of lung or liver fibrosis, reperfusion injury in various tissues, and conditions resulting from systemic cytokine damage.

A protein of the present invention may also be useful for promoting or inhibiting differentiation of tissues described above from precursor tissues or cells; or for inhibiting the growth of tissues described above.

The activity of a protein of the invention may, among other means, be measured by the following methods:

Assays for tissue generation activity include, without limitation, those described in: International Patent Publication No. WO95/16035 (bone, cartilage, tendon); International Patent Publication No. WO95/05846 (nerve, neuronal); International Patent Publication No. WO91/07491 (skin, endothelium).

Assays for wound healing activity include, without limitation, those described in: Winter, Epidermal Wound Healing, pps. 71-112 (Maibach, HI and Rovee, DT, eds.), Year Book Medical Publishers, Inc., Chicago, as modified by Eaglstein and Mertz, J. Invest. Dermatol 71:382-84 (1978).

Activin/Inhibin Activity

A protein of the present invention may also exhibit activin- or inhibin-related activities. Inhibins are characterized by their ability to inhibit the release of follicle stimulating hormone (FSH), while activins are characterized by their ability to stimulate the release of follicle stimulating hormone (FSH). Thus, a protein of the present invention, alone or in heterodimers with a member of the inhibin α family, may be useful as a contraceptive based on the ability of inhibins to decrease fertility in female mammals and decrease spermatogenesis in male mammals. Administration of sufficient amounts of other inhibins can induce infertility in these mammals. Alternatively, the protein of the invention, as a homodimer or as a heterodimer with other protein subunits of the inhibin- β group, may be useful as a fertility inducing therapeutic, based upon the ability of activin molecules in stimulating FSH release from cells of the anterior pituitary. See, for example, United States Patent 4,798,885. A protein of the invention may also be useful for advancement of the onset of fertility in sexually immature mammals, so as to increase the lifetime reproductive performance of domestic animals such as cows, sheep and pigs.

The activity of a protein of the invention may, among other means, be measured by the following methods:

Assays for activin/inhibin activity include, without limitation, those described in: Vale et al., *Endocrinology* 91:562-572, 1972; Ling et al., *Nature* 321:779-782, 1986; Vale et al., *Nature* 321:776-779, 1986; Mason et al., *Nature* 318:659-663, 1985; Forage et al., *Proc. Natl. Acad. Sci. USA* 83:3091-3095, 1986.

Chemotactic/Chemokinetic Activity

A protein of the present invention may have chemotactic or chemokinetic activity (e.g., act as a chemokine) for mammalian cells, including, for example, monocytes, fibroblasts, neutrophils, T-cells, mast cells, eosinophils, epithelial and/or endothelial cells. Chemotactic and chemokinetic proteins can be used to mobilize or attract a desired cell population to a desired site of action. Chemotactic or chemokinetic proteins provide particular advantages in treatment of wounds and other trauma to tissues, as well as in treatment of localized infections. For example, attraction of lymphocytes, monocytes or neutrophils to tumors or sites of infection may result in improved immune responses against the tumor or infecting agent.

A protein or peptide has chemotactic activity for a particular cell population if it can stimulate, directly or indirectly, the directed orientation or movement of such cell population. Preferably, the protein or peptide has the ability to directly stimulate directed movement of cells. Whether a particular protein has chemotactic activity for a population of

cells can be readily determined by employing such protein or peptide in any known assay for cell chemotaxis.

The activity of a protein of the invention may, among other means, be measured by the following methods:

Assays for chemotactic activity (which will identify proteins that induce or prevent chemotaxis) consist of assays that measure the ability of a protein to induce the migration of cells across a membrane as well as the ability of a protein to induce the adhesion of one cell population to another cell population. Suitable assays for movement and adhesion include, without limitation, those described in: Current Protocols in Immunology, Ed by J.E. Coligan, A.M. Kruisbeek, D.H. Margulies, E.M. Shevach, W. Strober, Pub. Greene Publishing Associates and Wiley-Interscience (Chapter 6.12, Measurement of alpha and beta Chemokines 6.12.1-6.12.28; Taub et al. J. Clin. Invest. 95:1370-1376, 1995; Lind et al. APMIS 103:140-146, 1995; Muller et al Eur. J. Immunol. 25: 1744-1748; Gruber et al. J. of Immunol. 152:5860-5867, 1994; Johnston et al. J. of Immunol. 153: 1762-1768, 1994.

Hemostatic and Thrombolytic Activity

A protein of the invention may also exhibit hemostatic or thrombolytic activity. As a result, such a protein is expected to be useful in treatment of various coagulation disorders (including hereditary disorders, such as hemophilias) or to enhance coagulation and other hemostatic events in treating wounds resulting from trauma, surgery or other causes. A protein of the invention may also be useful for dissolving or inhibiting formation of thromboses and for treatment and prevention of conditions resulting therefrom (such as, for example, infarction of cardiac and central nervous system vessels (e.g., stroke).

The activity of a protein of the invention may, among other means, be measured by the following methods:

Assay for hemostatic and thrombolytic activity include, without limitation, those described in: Linet et al., J. Clin. Pharmacol. 26:131-140, 1986; Burdick et al., Thrombosis Res. 45:413-419, 1987; Humphrey et al., Fibrinolysis 5:71-79 (1991); Schaub, Prostaglandins 35:467-474, 1988.

Receptor/Ligand Activity

A protein of the present invention may also demonstrate activity as receptors, receptor ligands or inhibitors or agonists of receptor/ligand interactions. Examples of such receptors and ligands include, without limitation, cytokine receptors and their ligands, receptor kinases and their ligands, receptor phosphatases and their ligands, receptors involved in cell-cell interactions and their ligands (including without limitation, cellular adhesion molecules (such as selectins, integrins and their ligands) and receptor/ligand pairs

involved in antigen presentation, antigen recognition and development of cellular and humoral immune responses). Receptors and ligands are also useful for screening of potential peptide or small molecule inhibitors of the relevant receptor/ligand interaction. A protein of the present invention (including, without limitation, fragments of receptors and ligands) may themselves be useful as inhibitors of receptor/ligand interactions.

The activity of a protein of the invention may, among other means, be measured by the following methods:

Suitable assays for receptor-ligand activity include without limitation those described in: Current Protocols in Immunology, Ed by J.E. Coligan, A.M. Kruisbeek, D.H. Margulies, E.M. Shevach, W. Strober, Pub. Greene Publishing Associates and Wiley-Interscience (Chapter 7.28, Measurement of Cellular Adhesion under static conditions 7.28.1-7.28.22), Takai et al., Proc. Natl. Acad. Sci. USA 84:6864-6868, 1987; Bierer et al., J. Exp. Med. 168:1145-1156, 1988; Rosenstein et al., J. Exp. Med. 169:149-160 1989; Stoltenberg et al., J. Immunol. Methods 175:59-68, 1994; Stitt et al., Cell 80:661-670, 1995.

Anti-Inflammatory Activity

Proteins of the present invention may also exhibit anti-inflammatory activity. The anti-inflammatory activity may be achieved by providing a stimulus to cells involved in the inflammatory response, by inhibiting or promoting cell-cell interactions (such as, for example, cell adhesion), by inhibiting or promoting chemotaxis of cells involved in the inflammatory process, inhibiting or promoting cell extravasation, or by stimulating or suppressing production of other factors which more directly inhibit or promote an inflammatory response. Proteins exhibiting such activities can be used to treat inflammatory conditions including chronic or acute conditions), including without limitation inflammation associated with infection (such as septic shock, sepsis or systemic inflammatory response syndrome (SIRS)), ischemia-reperfusion injury, endotoxin lethality, arthritis, complement-mediated hyperacute rejection, nephritis, cytokine or chemokine-induced lung injury, inflammatory bowel disease, Crohn's disease or resulting from over production of cytokines such as TNF or IL-1. Proteins of the invention may also be useful to treat anaphylaxis and hypersensitivity to an antigenic substance or material.

Tumor Inhibition Activity

In addition to the activities described above for immunological treatment or prevention of tumors, a protein of the invention may exhibit other anti-tumor activities. A protein may inhibit tumor growth directly or indirectly (such as, for example, via ADCC). A protein may exhibit its tumor inhibitory activity by acting on tumor tissue or tumor precursor tissue, by inhibiting formation of tissues necessary to support tumor growth (such

as, for example, by inhibiting angiogenesis), by causing production of other factors, agents or cell types which inhibit tumor growth, or by suppressing, eliminating or inhibiting factors, agents or cell types which promote tumor growth.

Other Activities

A protein of the invention may also exhibit one or more of the following additional activities or effects: inhibiting the growth, infection or function of, or killing, infectious agents, including, without limitation, bacteria, viruses, fungi and other parasites; effecting (suppressing or enhancing) bodily characteristics, including, without limitation, height, weight, hair color, eye color, skin, fat to lean ratio or other tissue pigmentation, or organ or body part size or shape (such as, for example, breast augmentation or diminution, change in bone form or shape); effecting biorhythms or circadian cycles or rhythms; effecting the fertility of male or female subjects; effecting the metabolism, catabolism, anabolism, processing, utilization, storage or elimination of dietary fat, lipid, protein, carbohydrate, vitamins, minerals, cofactors or other nutritional factors or component(s); effecting behavioral characteristics, including, without limitation, appetite, libido, stress, cognition (including cognitive disorders), depression (including depressive disorders) and violent behaviors; providing analgesic effects or other pain reducing effects; promoting differentiation and growth of embryonic stem cells in lineages other than hematopoietic lineages; hormonal or endocrine activity; in the case of enzymes, correcting deficiencies of the enzyme and treating deficiency-related diseases; treatment of hyperproliferative disorders (such as, for example, psoriasis); immunoglobulin-like activity (such as, for example, the ability to bind antigens or complement); and the ability to act as an antigen in a vaccine composition to raise an immune response against such protein or another material or entity which is cross-reactive with such protein.

ADMINISTRATION AND DOSING

A protein of the present invention (from whatever source derived, including without limitation from recombinant and non-recombinant sources) may be used in a pharmaceutical composition when combined with a pharmaceutically acceptable carrier. Such a composition may also contain (in addition to protein and a carrier) diluents, fillers, salts, buffers, stabilizers, solubilizers, and other materials well known in the art. The term "pharmaceutically acceptable" means a non-toxic material that does not interfere with the effectiveness of the biological activity of the active ingredient(s). The characteristics of the carrier will depend on the route of administration. The pharmaceutical composition of the invention may also contain cytokines, lymphokines, or other hematopoietic factors such as

M-CSF, GM-CSF, TNF, IL-1, IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-11, IL-12, IL-13, IL-14, IL-15, IFN, TNF0, TNF1, TNF2, G-CSF, Meg-CSF, thrombopoietin, stem cell factor, and erythropoietin. The pharmaceutical composition may further contain other agents which either enhance the activity of the protein or compliment its activity or use in treatment. Such additional factors and/or agents may be included in the pharmaceutical composition to produce a synergistic effect with protein of the invention, or to minimize side effects. Conversely, protein of the present invention may be included in formulations of the particular cytokine, lymphokine, other hematopoietic factor, thrombolytic or anti-thrombotic factor, or anti-inflammatory agent to minimize side effects of the cytokine, lymphokine, other hematopoietic factor, thrombolytic or anti-thrombotic factor, or anti-inflammatory agent.

A protein of the present invention may be active in multimers (e.g., heterodimers or homodimers) or complexes with itself or other proteins. As a result, pharmaceutical compositions of the invention may comprise a protein of the invention in such multimeric or complexed form.

The pharmaceutical composition of the invention may be in the form of a complex of the protein(s) of present invention along with protein or peptide antigens. The protein and/or peptide antigen will deliver a stimulatory signal to both B and T lymphocytes. B lymphocytes will respond to antigen through their surface immunoglobulin receptor. T lymphocytes will respond to antigen through the T cell receptor (TCR) following presentation of the antigen by MHC proteins. MHC and structurally related proteins including those encoded by class I and class II MHC genes on host cells will serve to present the peptide antigen(s) to T lymphocytes. The antigen components could also be supplied as purified MHC-peptide complexes alone or with co-stimulatory molecules that can directly signal T cells. Alternatively antibodies able to bind surface immunoglobulin and other molecules on B cells as well as antibodies able to bind the TCR and other molecules on T cells can be combined with the pharmaceutical composition of the invention.

The pharmaceutical composition of the invention may be in the form of a liposome in which protein of the present invention is combined, in addition to other pharmaceutically acceptable carriers, with amphipathic agents such as lipids which exist in aggregated form as micelles, insoluble monolayers, liquid crystals, or lamellar layers in aqueous solution. Suitable lipids for liposomal formulation include, without limitation, monoglycerides, diglycerides, sulfatides, lysolecithin, phospholipids, saponin, bile acids, and the like. Preparation of such liposomal formulations is within the level of skill in the art, as disclosed, for example, in U.S. Patent No. 4,235,871; U.S. Patent No. 4,501,728; U.S. Patent No. 4,837,028; and U.S. Patent No. 4,737,323, all of which are incorporated herein by reference.

As used herein, the term "therapeutically effective amount" means the total amount of each active component of the pharmaceutical composition or method that is sufficient to show a meaningful patient benefit, i.e., treatment, healing, prevention or amelioration of the relevant medical condition, or an increase in rate of treatment, healing, prevention or amelioration of such conditions. When applied to an individual active ingredient, administered alone, the term refers to that ingredient alone. When applied to a combination, the term refers to combined amounts of the active ingredients that result in the therapeutic effect, whether administered in combination, serially or simultaneously.

In practicing the method of treatment or use of the present invention, a therapeutically effective amount of protein of the present invention is administered to a mammal having a condition to be treated. Protein of the present invention may be administered in accordance with the method of the invention either alone or in combination with other therapies such as treatments employing cytokines, lymphokines or other hematopoietic factors. When co-administered with one or more cytokines, lymphokines or other hematopoietic factors, protein of the present invention may be administered either simultaneously with the cytokine(s), lymphokine(s), other hematopoietic factor(s), thrombolytic or anti-thrombotic factors, or sequentially. If administered sequentially, the attending physician will decide on the appropriate sequence of administering protein of the present invention in combination with cytokine(s), lymphokine(s), other hematopoietic factor(s), thrombolytic or anti-thrombotic factors.

Administration of protein of the present invention used in the pharmaceutical composition or to practice the method of the present invention can be carried out in a variety of conventional ways, such as oral ingestion, inhalation, topical application or cutaneous, subcutaneous, intraperitoneal, parenteral or intravenous injection. Intravenous administration to the patient is preferred.

When a therapeutically effective amount of protein of the present invention is administered orally, protein of the present invention will be in the form of a tablet, capsule, powder, solution or elixir. When administered in tablet form, the pharmaceutical composition of the invention may additionally contain a solid carrier such as a gelatin or an adjuvant. The tablet, capsule, and powder contain from about 5 to 95% protein of the present invention, and preferably from about 25 to 90% protein of the present invention. When administered in liquid form, a liquid carrier such as water, petroleum, oils of animal or plant origin such as peanut oil, mineral oil, soybean oil, or sesame oil, or synthetic oils may be added. The liquid form of the pharmaceutical composition may further contain physiological saline solution, dextrose or other saccharide solution, or glycols such as ethylene glycol, propylene glycol or polyethylene glycol. When administered in liquid form,

the pharmaceutical composition contains from about 0.5 to 90% by weight of protein of the present invention, and preferably from about 1 to 50% protein of the present invention.

When a therapeutically effective amount of protein of the present invention is administered by intravenous, cutaneous or subcutaneous injection, protein of the present invention will be in the form of a pyrogen-free, parenterally acceptable aqueous solution. The preparation of such parenterally acceptable protein solutions, having due regard to pH, isotonicity, stability, and the like, is within the skill in the art. A preferred pharmaceutical composition for intravenous, cutaneous, or subcutaneous injection should contain, in addition to protein of the present invention, an isotonic vehicle such as Sodium Chloride Injection, Ringer's Injection, Dextrose Injection, Dextrose and Sodium Chloride Injection, Lactated Ringer's Injection, or other vehicle as known in the art. The pharmaceutical composition of the present invention may also contain stabilizers, preservatives, buffers, antioxidants, or other additives known to those of skill in the art.

The amount of protein of the present invention in the pharmaceutical composition of the present invention will depend upon the nature and severity of the condition being treated, and on the nature of prior treatments which the patient has undergone. Ultimately, the attending physician will decide the amount of protein of the present invention with which to treat each individual patient. Initially, the attending physician will administer low doses of protein of the present invention and observe the patient's response. Larger doses of protein of the present invention may be administered until the optimal therapeutic effect is obtained for the patient, and at that point the dosage is not increased further. It is contemplated that the various pharmaceutical compositions used to practice the method of the present invention should contain about 0.01 μ g to about 100 mg (preferably about 0.1mg to about 10 mg, more preferably about 0.1 μ g to about 1 mg) of protein of the present invention per kg body weight.

The duration of intravenous therapy using the pharmaceutical composition of the present invention will vary, depending on the severity of the disease being treated and the condition and potential idiosyncratic response of each individual patient. It is contemplated that the duration of each application of the protein of the present invention will be in the range of 12 to 24 hours of continuous intravenous administration. Ultimately the attending physician will decide on the appropriate duration of intravenous therapy using the pharmaceutical composition of the present invention.

Protein of the invention may also be used to immunize animals to obtain polyclonal and monoclonal antibodies which specifically react with the protein. Such antibodies may be obtained using either the entire protein or fragments thereof as an immunogen. The peptide immunogens additionally may contain a cysteine residue at the carboxyl terminus, and are conjugated to a hapten such as keyhole limpet hemocyanin (KLH). Methods for

synthesizing such peptides are known in the art, for example, as in R.P. Merrifield, J. Amer.Chem.Soc. 85, 2149-2154 (1963); J.L. Krstenansky, *et al.*, FEBS Lett. 211, 10 (1987). Monoclonal antibodies binding to the protein of the invention may be useful diagnostic agents for the immunodetection of the protein. Neutralizing monoclonal antibodies binding to the protein may also be useful therapeutics for both conditions associated with the protein and also in the treatment of some forms of cancer where abnormal expression of the protein is involved. In the case of cancerous cells or leukemic cells, neutralizing monoclonal antibodies against the protein may be useful in detecting and preventing the metastatic spread of the cancerous cells, which may be mediated by the protein.

For compositions of the present invention which are useful for bone, cartilage, tendon or ligament regeneration, the therapeutic method includes administering the composition topically, systematically, or locally as an implant or device. When administered, the therapeutic composition for use in this invention is, of course, in a pyrogen-free, physiologically acceptable form. Further, the composition may desirably be encapsulated or injected in a viscous form for delivery to the site of bone, cartilage or tissue damage. Topical administration may be suitable for wound healing and tissue repair. Therapeutically useful agents other than a protein of the invention which may also optionally be included in the composition as described above, may alternatively or additionally, be administered simultaneously or sequentially with the composition in the methods of the invention. Preferably for bone and/or cartilage formation, the composition would include a matrix capable of delivering the protein-containing composition to the site of bone and/or cartilage damage, providing a structure for the developing bone and cartilage and optimally capable of being resorbed into the body. Such matrices may be formed of materials presently in use for other implanted medical applications.

The choice of matrix material is based on biocompatibility, biodegradability, mechanical properties, cosmetic appearance and interface properties. The particular application of the compositions will define the appropriate formulation. Potential matrices for the compositions may be biodegradable and chemically defined calcium sulfate, tricalciumphosphate, hydroxyapatite, polylactic acid, polyglycolic acid and polyanhydrides. Other potential materials are biodegradable and biologically well-defined, such as bone or dermal collagen. Further matrices are comprised of pure proteins or extracellular matrix components. Other potential matrices are nonbiodegradable and chemically defined, such as sintered hydroxyapatite, bioglass, aluminates, or other ceramics. Matrices may be comprised of combinations of any of the above mentioned types of material, such as polylactic acid and hydroxyapatite or collagen and tricalciumphosphate. The bioceramics may be altered in composition, such as in calcium-aluminate-phosphate and processing to alter pore size, particle size, particle shape, and biodegradability.

Presently preferred is a 50:50 (mole weight) copolymer of lactic acid and glycolic acid in the form of porous particles having diameters ranging from 150 to 800 microns. In some applications, it will be useful to utilize a sequestering agent, such as carboxymethyl cellulose or autologous blood clot, to prevent the protein compositions from disassociating from the matrix.

A preferred family of sequestering agents is cellulosic materials such as alkylcelluloses (including hydroxyalkylcelluloses), including methylcellulose, ethylcellulose, hydroxyethylcellulose, hydroxypropylcellulose, hydroxypropyl- methylcellulose, and carboxymethylcellulose, the most preferred being cationic salts of carboxymethylcellulose (CMC). Other preferred sequestering agents include hyaluronic acid, sodium alginate, poly(ethylene glycol), polyoxyethylene oxide, carboxyvinyl polymer and poly(vinyl alcohol). The amount of sequestering agent useful herein is 0.5-20 wt%, preferably 1-10 wt% based on total formulation weight, which represents the amount necessary to prevent desorption of the protein from the polymer matrix and to provide appropriate handling of the composition, yet not so much that the progenitor cells are prevented from infiltrating the matrix, thereby providing the protein the opportunity to assist the osteogenic activity of the progenitor cells.

In further compositions, proteins of the invention may be combined with other agents beneficial to the treatment of the bone and/or cartilage defect, wound, or tissue in question. These agents include various growth factors such as epidermal growth factor (EGF), platelet derived growth factor (PDGF), transforming growth factors (TGF- α and TGF- β), and insulin-like growth factor (IGF).

The therapeutic compositions are also presently valuable for veterinary applications. Particularly domestic animals and thoroughbred horses, in addition to humans, are desired patients for such treatment with proteins of the present invention.

The dosage regimen of a protein-containing pharmaceutical composition to be used in tissue regeneration will be determined by the attending physician considering various factors which modify the action of the proteins, e.g., amount of tissue weight desired to be formed, the site of damage, the condition of the damaged tissue, the size of a wound, type of damaged tissue (e.g., bone), the patient's age, sex, and diet, the severity of any infection, time of administration and other clinical factors. The dosage may vary with the type of matrix used in the reconstitution and with inclusion of other proteins in the pharmaceutical composition. For example, the addition of other known growth factors, such as IGF I (insulin like growth factor I), to the final composition, may also effect the dosage. Progress can be monitored by periodic assessment of tissue/bone growth and/or repair, for example, X-rays, histomorphometric determinations and tetracycline labeling.

Polynucleotides of the present invention can also be used for gene therapy. Such polynucleotides can be introduced either *in vivo* or *ex vivo* into cells for expression in a mammalian subject. Polynucleotides of the invention may also be administered by other known methods for introduction of nucleic acid into a cell or organism (including, without limitation, in the form of viral vectors or naked DNA).

Cells may also be cultured *ex vivo* in the presence of proteins of the present invention in order to proliferate or to produce a desired effect on or activity in such cells. Treated cells can then be introduced *in vivo* for therapeutic purposes.

Patent and literature references cited herein are incorporated by reference as if fully set forth.

What is claimed is:

1. An isolated polynucleotide comprising a nucleotide sequence selected from the group consisting of:

SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:66, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:94, SEQ ID NO:95, SEQ ID NO:96, SEQ ID NO:97, SEQ ID NO:98, SEQ ID NO:99, SEQ ID NO:100, SEQ ID NO:101, SEQ ID NO:102, SEQ ID NO:103, SEQ ID NO:104, SEQ ID NO:105, SEQ ID NO:106, SEQ ID NO:107, SEQ ID NO:108, SEQ ID NO:109, SEQ ID NO:110, SEQ ID NO:111, SEQ ID NO:112, SEQ ID NO:113, SEQ ID NO:114, SEQ ID NO:115, SEQ ID NO:116, SEQ ID NO:117, SEQ ID NO:118, SEQ ID NO:119, SEQ ID NO:120, SEQ ID NO:121, SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, SEQ ID NO:132, SEQ ID NO:133, SEQ ID NO:134, SEQ ID NO:135, SEQ ID NO:136, SEQ ID NO:137, SEQ ID NO:138, SEQ ID NO:139, SEQ ID NO:140, SEQ ID NO:141, SEQ ID NO:142, SEQ ID NO:143, SEQ ID NO:144, SEQ ID NO:145, SEQ ID NO:146, SEQ ID NO:147, SEQ ID NO:148, SEQ ID NO:149, SEQ ID NO:150, SEQ ID NO:151, SEQ ID NO:152, SEQ ID NO:153, SEQ ID NO:154, SEQ ID NO:155, SEQ ID NO:156, SEQ ID NO:157, SEQ ID NO:158, SEQ ID NO:159, SEQ ID NO:160, SEQ ID NO:161, SEQ ID NO:162, SEQ ID NO:163, SEQ ID NO:164, SEQ ID NO:165, SEQ ID NO:166, SEQ ID NO:167, SEQ ID NO:168, SEQ ID NO:169, SEQ ID NO:170, SEQ ID NO:171, SEQ ID

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or a complement of said sequence.

2. An isolated polynucleotide consisting of a nucleotide sequence selected from the group consisting of:

SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:66, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID

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or a complement of said sequence.

3. An isolated polynucleotide comprising a nucleotide sequence which hybridizes to a sequence selected from the group consisting of:

SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:25, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:31, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:37, SEQ ID NO:38, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:47, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:56, SEQ ID NO:57, SEQ ID NO:58, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:62, SEQ ID NO:63, SEQ ID NO:64, SEQ ID NO:65, SEQ ID NO:66, SEQ ID NO:67, SEQ ID NO:68, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, SEQ ID NO:72, SEQ ID NO:73, SEQ ID NO:74, SEQ ID NO:75, SEQ ID NO:76, SEQ ID NO:77, SEQ ID NO:78, SEQ ID NO:79, SEQ ID NO:80, SEQ ID NO:81, SEQ ID NO:82, SEQ ID NO:83, SEQ ID NO:84, SEQ ID NO:85, SEQ ID NO:86, SEQ ID NO:87, SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:94, SEQ ID NO:95, SEQ ID NO:96, SEQ ID NO:97, SEQ ID NO:98, SEQ ID NO:99, SEQ ID NO:100, SEQ ID NO:101, SEQ ID NO:102, SEQ ID NO:103, SEQ ID NO:104, SEQ ID NO:105, SEQ ID NO:106, SEQ ID NO:107, SEQ ID NO:108, SEQ ID NO:109, SEQ ID NO:110, SEQ ID NO:111, SEQ ID NO:112, SEQ ID NO:113, SEQ ID NO:114, SEQ ID NO:115, SEQ ID NO:116, SEQ ID NO:117, SEQ ID NO:118, SEQ ID NO:119, SEQ ID NO:120, SEQ ID NO:121, SEQ ID NO:122, SEQ ID NO:123, SEQ ID NO:124, SEQ ID NO:125, SEQ ID NO:126, SEQ ID NO:127, SEQ ID NO:128, SEQ ID NO:129, SEQ ID NO:130, SEQ ID NO:131, SEQ ID NO:132, SEQ ID NO:133, SEQ ID NO:134, SEQ ID NO:135, SEQ ID NO:136, SEQ ID NO:137, SEQ ID NO:138, SEQ ID NO:139, SEQ ID NO:140, SEQ ID NO:141, SEQ ID NO:142, SEQ ID NO:143, SEQ ID NO:144, SEQ ID NO:145, SEQ ID NO:146, SEQ ID NO:147, SEQ ID NO:148, SEQ ID NO:149, SEQ ID NO:150, SEQ ID NO:151, SEQ ID NO:152, SEQ ID NO:153, SEQ ID NO:154, SEQ ID NO:155, SEQ ID NO:156, SEQ ID NO:157, SEQ ID NO:158, SEQ ID NO:159, SEQ ID NO:160, SEQ ID NO:161, SEQ ID NO:162, SEQ ID NO:163, SEQ ID NO:164, SEQ ID NO:165, SEQ ID NO:166, SEQ ID NO:167, SEQ ID NO:168, SEQ ID NO:169, SEQ ID NO:170, SEQ ID NO:171, SEQ ID NO:172, SEQ ID NO:173, SEQ ID NO:174, SEQ ID NO:175, SEQ ID NO:176, SEQ ID NO:177, SEQ ID NO:178, SEQ ID NO:179, SEQ ID NO:180, SEQ ID NO:181, SEQ ID

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or to a complement of said sequence.

4. The polynucleotide of any one of claims 1-3, wherein said polynucleotide is operably linked to at least one expression control sequence.

5. A vector comprising the polynucleotide of claim 4.

6. A host cell transformed with a vector comprising the polynucleotide of any one of claims 1-3.

7. A process for producing a protein encoded by the polynucleotide of claim 4, which process comprises:

- (a) growing a culture of a host cell in a suitable culture medium, wherein the host cell has been transformed with the polynucleotide of claim 4; and
- (b) purifying said protein from the culture.

8. A protein produced according to the process of claim 7.

9. An antibody that specifically binds to the protein of claim 8.

10. A method for detecting the protein of claim 8, comprising contacting a sample suspected of containing the protein with an antibody that specifically binds to the protein, under conditions such that the antibody binds the protein and the protein is detected.

11. A method for detecting the polynucleotide of any one of claims 1-3, comprising contacting a sample suspected of containing the polynucleotide with a polynucleotide reagent that hybridizes to the polynucleotide, under conditions such that the reagent binds the polynucleotide and the polynucleotide is detected.

12. The method of claim 10, wherein the sample is a biological sample.

13. The method of claim 12, where the biological sample is isolated from a human.

14. The method of claim 11, wherein the sample is a biological sample.

15. The method of claim 14, where the biological sample is isolated from a human.

16. A method of identifying a compound that modulates the activity of the protein of claim 8, comprising contacting a composition comprising the protein with a test compound and monitoring the effect of the test compound on the activity of the protein, such that a modulatory compound is identified.

17. A method of identifying a compound that modulates the expression of the polynucleotide of any one of claims 1-3, comprising contacting a cell that expresses the polynucleotide with a test compound and determining the effect of the test compound on the expression of the polynucleotide, such that a modulatory compound is identified.

18. A method of identifying a compound that modulates the production of the protein of claim 8, comprising contacting a cell that produces the protein with the test compound and determining the effect of the test compound on the production of the protein, such that a modulatory compound is identified.

19. A method of treating a subject having a disorder characterized by aberrant expression of the polynucleotide of any one of claims 1-3, comprising administering to said subject a therapeutically effective amount of a compound that modulates expression of the polypeptide, such that treatment is effected.

20. A method of treating a subject having a disorder characterized by aberrant production of the protein of claim 8, comprising administering to said subject a therapeutically effective amount of a compound that modulates production of the protein, such that treatment is effected.

21. A method of treating a subject having a disorder characterized by aberrant activity of the protein of claim 8, comprising administering to said subject a therapeutically effective amount of a compound that modulates activity of the protein, such that treatment is effected.

SEQUENCE LISTING

<110> Wong, Gordon G.
 Clark, Hilary
 Fechtel, Kim
 Agostino, Michael J.
 Howes, Steven H.
 Resnick, Richard J.
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<210> 2

<211> 794

<212> DNA

<213> Homo sapiens

<400> 2

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gtctcactcc tccacccac acactgaagc agtagcttct gggccaaagg tcaggggtggg 720
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<210> 3

<211> 1166

<212> DNA

<213> Homo sapiens

<400> 3

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<210> 4

<211> 731

<212> DNA

<213> Homo sapiens

<400> 4

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<210> 5

<211> 441

<212> DNA

<213> Homo sapiens

<400> 5

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441

<210> 6

<211> 455

<212> DNA

<213> Homo sapiens

<400> 6

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cccgcgaag atcggcgtgt gcatcatcgt gctggtgggc gacgtgtgct tctgctggt 180
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<210> 7

<211> 407

<212> DNA

<213> Homo sapiens

<400> 7

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ggaactggag gaacaactga ccccggtggc ggaggagacg cgggcacggc tgtccaagga 360
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<210> 8

<211> 604

<212> DNA

<213> Homo sapiens

<400> 8

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<210> 9

<211> 656

<212> DNA

<213> Homo sapiens

<400> 9

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ctagtgcacc atgtattagc ttccatggcc cccaccccag cccccaccac accccctttc 600
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<210> 10

<211> 801

<212> DNA

<213> Homo sapiens

<400> 10

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<210> 11

<211> 658

<212> DNA

<213> Homo sapiens

<400> 11

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<210> 12

<211> 574

<212> DNA

<213> Homo sapiens

<400> 12

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 cccagctaac ctgtctgatg gtggcatctt cctgcagaca tttcaaacaat gtaactttta 540
 tatgaaaaaa aataaacaca gatgaaagct gcc 574

<210> 13

<211> 589

<212> DNA

<213> Homo sapiens

<400> 13

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<210> 14

<211> 779

<212> DNA

<213> Homo sapiens

<400> 14

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<210> 15

<211> 415

<212> DNA

<213> Homo sapiens

<400> 15

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<210> 16

<211> 436

<212> DNA

<213> Homo sapiens

<400> 16

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<210> 17

<211> 743

<212> DNA

<213> Homo sapiens

<400> 17

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ttccccctg cgggggggcg cgggggcggc tgacgggacc gccgggaccg cggggggtgt 720
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<210> 18

<211> 785

<212> DNA

<213> Homo sapiens

<400> 18

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tgcccagggt tgtgttgaga ccattgacaa ctgctcgtgt acaggcacc cagagcccca 720
gagcatgggg cacagcaggg atgcgagtga gaggatgaag ggggaataaa tcagtacaac 780
tcgtg 785

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<210> 19

<211> 434

<212> DNA

<213> Homo sapiens

<400> 19

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tgcgagtggg caattgagta gtacagtggg acctgttaaa tgcataacct aattttcctg 180
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aacgaactcc actgaactgg tgggacgcct gttgttactg aatgtgttgg tgactnaata 420
aaaaacgagc gagc 434

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<210> 20

<211> 920

<212> DNA

<213> Homo sapiens

<400> 20

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aggggcagca gactgcagtt tcagcagaac aatgcagaga gcacaatagt acccatcaaa 840
ggcaaagata ggaagcctgg gaacctggtc tgattccttc caacgtgcac ttcagctgga 900
gaaagaaacc aagaaggga

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<210> 21

<211> 757

<212> DNA

<213> Homo sapiens

<400> 21

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ggcccagtc ctatgtagt gaggggcaga caccctccc caaattcttg aaggttctta 60
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gaacggagct gccgtcgcca tgtttggctg cttgggtggc gggagggctg tgcaaacagc 180
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atcatttgct gtctctcagg cccagatgac accaagccca tctgaaatgt tcattccggc 660
aaatgtggt ctgaaatggt atgaaaactt tcaaagacga ctagcacaga accctctctt 720
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<210> 22

<211> 386

<212> DNA

<213> Homo sapiens

<400> 22

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cagagcttca gccagcaca gaagcaagac aaaatcagtg gctcttagag tttagaaaac 60
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gatgtctggc cttttaattc ctctctgcc aggttgggtc ctgggacctc taatgtgggc 180
atgtcgtcca cccaggagc agccatcagg gacagacccc ccaccccaa ggctgcagcc 240
acaccatgtt tcaggcttgg ggctggggca ggcttgggct caatcctggg caccagggg 300
cagccacccc ctaacctggc tctaccacac cttgcccttg aaggatgggc tgctgcacgt 360
ctccctcctc caccacatac cacacc

```

<210> 23

<211> 622

<212> DNA

<213> Homo sapiens

<400> 23

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gaggtgtctg gggagaccca aacatcaagc tgggggaggg tgctgaggtg gaggtagaag 180
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tctgacagga tctgcagtc ctgccacaa cctcctctc tgctctctgg gcagtagtgg 480
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gggagccgct ccagctgatg ag

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<210> 24
 <211> 514
 <212> DNA
 <213> Homo sapiens

<400> 24
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 caagatttac tcttgccatt ttctagtact gtgggatttt ttctttttct tttcccctg 180
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 agagaaatgc taacaatttg ttgaatagtc cataaaaaag caaagctggc ctggcgcggt 420
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 cagcctggnc cacatgggtga aaccgctctc cact 514

<210> 25
 <211> 884
 <212> DNA
 <213> Homo sapiens

<400> 25
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 gggctgccat ggacagtgtg cctctgatca gccccttggg catcagccag ctccagccgc 180
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 agcccttttag cccggcccg gcgtcctccg ccagctcctg tgaccagcgc gtctcccgat 780
 gctctccgcc gtgttcgtgt ccccaggagc cctcgctgca gccccgccc cgtgggttct 840
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<210> 26
 <211> 408
 <212> DNA
 <213> Homo sapiens

<400> 26
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 tcgatgaacc tcaaagctct ggacagatgt ccttgagtc acggggggaa gaatacctgg 180
 tttgggtgacc agctcctgcc cgggaaggctc agggctcagt ccgctgctgc cactctgatg 240
 gcctcccga atcgcagctc cccaagagg ggctctttc tctgtctccg catccccgtc 300
 cttcccggtg tcgccagggc cgccccgcag cagccaaacg aaaagtgtc cggccagacc 360
 ccctccaacc agcagggcg accagacggc gcccatggct gagaggcc 408

<210> 27
 <211> 483
 <212> DNA
 <213> Homo sapiens

<400> 27
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 tggcgacggc cgcgggtctg tgagcagcgg gggcgggggc tgggtgtggc cctccttct 120
 cccgtcccca agttccctgg gtgggaacgg ggtcttgggg tccttggtg ggtggccaga 180
 cccgaagcc agcgtggga agggctgcgg atgccccggg cagaagaaag ggcagggtcca 240
 aagacacgcg ggtctggtcc tgggcaagaa ccgccccctc cggggcctgc ttcagtcttc 300
 ctttgcagaa caacgggcaa ggcccttccc tctgccccgg gtgcttgaag tctagcccca 360

tectgggtcca atgcgctctt ggtagcctcc tttcccagct gccggccggc ggccatgcgg 420
 cccttactgc ccctgcgcgt gtgcccgggtg tggccccgca accctccctc ccggtccta 480
 gga 483

<210> 28
 <211> 652
 <212> DNA
 <213> Homo sapiens

<400> 28
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 aagagacggg acatcctagc gatcgtcctc atcgtgctgc cctggactct gctcatcact 120
 gtctggcacc agagcaccct cgcacccctg ctgcggtac ataaggatga gggcagtgac 180
 ccccgacgcg aaacgcccgc cggcgccgac ccagggagt actgcacgtc tgaccgcgac 240
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 ctgcccacca tccacgtggt gacgcccacc tacagccgcc cgggtgcagaa ggccgagctg 360
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 gcgcccgcgc ggacgcccgt gaccgcgcgc ctgctgcgcg acaccggcct caactacacg 480
 cactctgcacg tggagacgcc ccgcaactac aagctgcgcg gagacgcccg cgaccacgcg 540
 atcccgcggg gcaccatgca gcgcaacctg gccctgcgct ggctgcgcga gacctcccg 600
 cgcaactcca gccagcctgg cgtggtctac ttcgcccagc acgacaacac at 652

<210> 29
 <211> 510
 <212> DNA
 <213> Homo sapiens

<400> 29
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 ctgaagagca gagaatgcca tgggtgggac tgtgggggtc ggatcgtggg gttgttggca 120
 gagggcaacc ctggggccca caccgtgtgg acaggcagac accagattgt ccaggagcag 180
 gagctgctgg gactgcgctg gcccggacc tagtgggct tctoctggct gctgagatgt 240
 cgtctgtgac tggcctggct ggagggggag tgttgacaac ccaaagctgt tctccagtct 300
 ggggagggag aggcagggtc cccaatgtcc gagctgcac tggacgctgc tcttaaagga 360
 cctctggggg caggggagcg gtagggctcg gactgggcag atgctgtatg acctccctga 420
 gcaccctgta ctgccccatg ctttccctt tgtgctctgt gtgtgtctgg gctgtgcccg 480
 ggggcttcac aaataaagtc gtgtggcagc 510

<210> 30
 <211> 743
 <212> DNA
 <213> Homo sapiens

<400> 30
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 gaaccccagc ctgcacgccc ggttagcatt cggccgggag atgcggcagt ggaatctgga 120
 agggcggtga aaaacctacg tctgcccctc gcccgccctc tccattcgtc ccccgggtag 180
 agaggtgccc ggctcccacc ccttcccagc ccagccctg gagacagcag cccctagact 240
 actgagggac agcgacagca tgaaggctcc gggtcggctc gtgctcatca tctgtgtctc 300
 cgtggtcttc tctgcgctct acatcctcct gtgctgctgg gccggcctgc cctctgcct 360
 ggccacctgc ctggaccacc acttccccac aggtccagg cccactgtgc cgggacctc 420
 gcacttcagt ggatatagca gtgtgccaga tgggaagccg ctggtccgcg agccctgccg 480
 cagctgtgcc gtggtgtcca gctccggcca aatgctgggc tcaggcctgg gtgctgagat 540
 cgacagtgcc gagtgcgtgt tccgcatgaa ccaggcgcgc accgtgggct ttgaggcgga 600
 tgtgggccag cgcagcacc tgcgtgtcgt ctcacacaca agcgtgccgc tgcgtgtcgc 660
 caactattca cactacttcc agaaggcccc agacacactc tacatggtgt ggggcccagg 720
 caggcacatg gaccgggtgc tcg 743

<210> 31
 <211> 790
 <212> DNA
 <213> Homo sapiens

<400> 31


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ctcagatata aaggaaaggt actggcttga agtcacaacc acgacaggag taaggatttg 60
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ctctccatca ccaaactcctt actccaaatc cagaagtcag agccaaactcc catcttggtt 180
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cacatttagg aaatggttaa gaagtgtaaa ctgaaccctt atccttgtct tcaatcttcc 300
tccctgtaga catctatctt attatggtta ttattcagaa aaccagggga tacagggttg 360
tcttcttact ttgataactc ttcttagttt aaaataataa ttaataaacac atctttggtc 420
atctatgtca cacaaaaatt ttctttgtt tgcggggggc tggggatgca gtgttttttg 480
gggggtcttg gtttatgctc cctgcccttg agccctcag ccgtttgcc tgccccacc 540
tcggctccat ggtggggggg ggctctggtc ttttctaagg tgggcgggtt gtcttttgat 600
ctttcccttt tggatgtgcg tgtgtctgcg tgtgccatgt gcgtggcacg cttatgagtg 660
tgtgtgctg tgaacggctt tgggtcctgc tggttttgct gtgggctgca gtgttctgtg 720
ggtctgtggt atctgacact gtggacatta atgttcttct tgggcttttt tataaatttt 780
ttaacagttc                                     790

```

<210> 32

<211> 652

<212> DNA

<213> Homo sapiens

<400> 32

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catagggtatt aatttttaaat caactttttt gagggataat tagagacagt aaaagggggc 120
catttttaact gttgtctgat ttaaatatta acacgggtca ggtcagcaca ttagtttgct 180
tttatataga tgtagaaca aagtttctca tgctgtttct gtttaagtga aaatttcctt 240
gagattgcaa agcaaacctg taccactgta gccacttatt tgttgtgcat caagattttt 300
ttcagtatta tgcaattaag ttaaaataga gacatagggtg ttgaggtaaa tgttaagact 360
ataccttgcc gggcgcggtg gctcacacct gtaatcccag cactttgttg ggctggggcg 420
ggcagatcgc gaggtcagga gategggact atcctggcca acacggtgag gccccctctc 480
tactaaaaat ataaaaaatt acccgtgcat ggttgcgggc gcctgtgggc ccggctactc 540
aggaggctga ggcaggagaa ttatgtgaac ccgggaggcg gcccttgccg tgagccaaga 600
tcgcgtcact gcactccagc ctgggtgaca gagcaagact ctgtctcttt gc 652

```

<210> 33

<211> 827

<212> DNA

<213> Homo sapiens

<400> 33

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cgccgatctg ctgttcagtg acccctccca gaggtagcct gagaccaaaag acttctggct 60
caacatggca gctctgaccg aagccctgca gcgccaggca gagcagaacc ccaactgcctc 120
ctactacaac gtgggtgctgc tgcgatacca gttctccgc ccgggtcccc agtctgtgcc 180
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ggagaagcgg ctacttgga ggcttcaga tgtgtccgag gcaggcgggt ctggccgctt 420
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caccagcgag gggaccactc tgtcgggct ggacttgaa ctggtgggca gcggttaccg 540
catgtcgtg gtgaagagga ggtttgccac agggatgtac ctggtgagct gctgaacctg 600
caaatgctgc tgccccagct ctacactgcg cccgtgtgct ggctgaccac cccctgccct 660
cctgccggac cctggggcct cccaccccag cctccctgag gccatactc cacggagagg 720
agccccatgc ccagcctggc tgagcccgag attcgtcct cccctcatg ccaaccccac 780
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```

<210> 34

<211> 689

<212> DNA

<213> Homo sapiens

<400> 34

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gtctgttttc ccagtatcct gagatctcat catggtgaat ttccattccg acttataact 60
gacaatcttt aatcatgtat cttgttgac aggaatgact tccctgttc tcttacaact 120
ggcacacagt gacttctcat tcaagactca gttcaaagat ctctttctgt gggaaacatt 180
acctggcaat actgccatct gtatagtgt gaaacaactg cttctcagga taacaattct 240

```

```

caaatattca ggtatataaa atcatgtgag tagatcatta aaaaaatgta tatectcagg 300
ttccatcccc agacactaat tcagaaggaa tgagatgaag tcaaagaatc tgcattttta 360
actaatgaag cgaaataattc ttatacagtc ccaagatcat actttgaaaa gctctacatt 420
aggagaaaaat ttaaaaatttg tatcaagaat tacttttagaa taactcagtt ggcacagtgt 480
gtgtggcatt aaaactagat ttactaagaa agaaaattaa gcattcacct cttgaaatct 540
caaaaatgcca attaggtttt cacttttaat cacatttctc tatataactc cctctccaca 600
gagcagtcag agagatctat taaaatatca accagatctc ctgcctaaaa ccctctaata 660
gctttgtatt acaattagaa aaaaaaaag 689

```

<210> 35

<211> 627

<212> DNA

<213> Homo sapiens

<400> 35

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attaatttct gtggttggtta cagaataagt ctaatcaagg agaagtttct gtttgacgtt 60
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tagagtatac ccgttactta aaaagaagtc tgaaatgttc gttttgtgga aaagaaacta 180
gttaaattta ctattcctaa cccgaatgaa attagccttt gccttattct gtgcatgggt 240
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agagagtact ggttccttca gtagtgagta tttctcatag tgcagcttta tttatctcca 540
ggatgttttt gtggctgtat ttgattgata tgtgcttctt ctgattcttg ctaatttcca 600
accatattga ataaatgtga tcaagcc 627

```

<210> 36

<211> 595

<212> DNA

<213> Homo sapiens

<400> 36

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accggacggg ctttcactac cattcctaca gtgattggca agataccgtt tctacctcac 180
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gaagccctgt ctctactaaa aataccaaaa attggctggg cgtgggtggg ggcgcctgtg 480
gtcccggcta ctggggaggc tgaggcggga gaatggcgtg aaccggggag gcggagcttg 540
tagtgagccg agatcactgc cctccagcct gggcgacaga gcaagactcc gtctc 595

```

<210> 37

<211> 702

<212> DNA

<213> Homo sapiens

<400> 37

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ctcctccacc cgcccaggag agccccacct cctccacccc tgctctctct ccaacctctg 60
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cctctgccct gcatgggcag gcatttggtc cctacctggg tggcctgctc cctgctctgg 180
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ccgagggcac tgtgaaggct cccatgccac acagtgaaga ctgtagcctc tgcgtccaag 600
gcacacaggg tactttctgg acccactgct ggacagactt gaagggtgtc tgccgggtgt 660
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<210> 38

<211> 719
 <212> DNA
 <213> Homo sapiens

<400> 38
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 cccaggtac attcatggtg tgacagacac atgggtacaa ataaaagacc cagaaagcc 719

<210> 39
 <211> 463
 <212> DNA
 <213> Homo sapiens

<400> 39
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 gctctacctt gaagtgttcc tcagggttgg ggcgagagtc ggggtgggga ccgagatgca 180
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 cgcggggcgg gccctgcggg cgcggggctg aaggcggaac cacgacgggc agagagcacg 420
 gagccgggaa gccctgggc gcccgctcgga gggctatgga gca 463

<210> 40
 <211> 377
 <212> DNA
 <213> Homo sapiens

<400> 40
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 gtctctcctg ctctcataat gaagacatag ccgattctct gcccgggccc cttgctgatg 180
 ctctccggg tctgcgtcgg gcgtgggtct ctgggggacc tccagagggtg gaggtgggct 240
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 aaacatgtaa tattttc 377

<210> 41
 <211> 645
 <212> DNA
 <213> Homo sapiens

<400> 41
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 gtgaaatgtg accctogcca tggtaaatac atggcttgct gcctgttata ccgtgggtgac 120
 gtgggtccca aagatgtcaa tgctgccatt gccaccatca aaaccaagcg taccatccag 180
 tttgtggatt ggtgccccac tggcttcaag gttggcatta attaccagcc tcccactgtg 240
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 gctgttgccg aggcctgggc tcgcctggac cacaagtttg acctgatgta tgccaagcgt 360
 gcctttgttc actggtacgt ggggtgagggt atggagggaag gcgagttttc agaggcccg 420
 gaggacatgg ctgcccttga gaaggattat gaggaggttg gagcagatag tgctgacgga 480
 gaggatgagg gtgaagagta ttaacctgtg tgctgtactt ttacactcct ttgtcttggt 540
 actgtcttat tttgttctg taaatgtcta ttgccgtaaa ttgttaataa aattgatggt 600
 tccattttta atgtcaaaaa aaaaaaaaaa aaaaaaaan anann 645

<210> 42
 <211> 900
 <212> DNA
 <213> Homo sapiens

<400> 42
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 cggccggcgc cccatagcca gccctccgtc acctcttcac cgcacctcg gactgcccc 120
 agggccccgc cgcgcctcca gcgcgcgcga gcaccgcgc cgcgcgcgc tctccttagt 180
 cgcgcgcctg acgaccgct ccacctcgca ggtgcgcag aactaccacc aggactcaga 240
 ggccgccatc aaccgccaga tcaacctgga gctctacgcc tcctacgttt acctgtccat 300
 gtcttactac tttgaccgag atgatgtggc tttgaagaac tttgccaat actttcttca 360
 ccaatctcat gaggagagg aacatgctga gaaactgat aagctgcaga accaacgagg 420
 tggccgaatc ttccttcagg atatcaagaa accagactgt gatgactggg agagcgggct 480
 gaatgcaatg gagtgtgcat tacatttggg aaaaaatgta aatcagtcac tactggaact 540
 gcacaaactg gccactgaca aaaatgacct ccatttgtgt gacttcattg agacacatta 600
 cctgaatgag cagggtgaaag ccatcaaaga attgggtgac cagctgacca acttgogcaa 660
 gatgggagcg cccgaatctg gcttggcgga atatctcttt gacaagcaca ccctgggaga 720
 cagtataat gaaagctaag cctcgggcta atttcccat agcctggggg tgacttccct 780
 ggtcaccaag gcagtgcag catgttgggg tttcctttac cttttctata agttgtacca 840
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<210> 43
 <211> 552
 <212> DNA
 <213> Homo sapiens

<400> 43
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 atcgccacca ctctcattgc cgacctcttt gtggccgacc agcggagccg gatgtcagc 180
 atcttctact ttgccattcc ggtgggcagt ggtctgggct acattgcagg ctccaaagt 240
 aaggatatgg ctggagactg gcaactgggt ctgaggggtga gtctggtctt ggcctggggg 300
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 atttttcttt taagagacgg ggtcttgttg tgcgcccgg gctgcagtgc agtgggtcag 420
 tcatagctcg ctgtagcctg gaacgcctgg gctgaggtgg gagaatcact tgaaccaggg 480
 aggcggagggt tgcagcgggc tgagattgtg ccactgcact ctagcctggg cgacagtgcg 540
 agactccttc tc 552

<210> 44
 <211> 728
 <212> DNA
 <213> Homo sapiens

<400> 44
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 gctggcacct ccatcaacca ctcccaggcg gtgctccagc gcttgacagga gctgctgagg 180
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 gtattccacg cccaccgcct gctgctggga ctgcacagtg agctgttccct ggagctgcta 300
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 ttcatacagg acctgtactg cggggagctg accgtgctgc tgaccagggc catccccctg 420
 cacagactgg ccaccaagta cggcgtgtcc tccctgcagc gcggcgtggc cgactacatg 480
 cgcgcgcacc tggcgggagg cgcgggcccg gcgggtgggt ggtaccacta cgcgggtggc 540
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 gtggcggcca gcaccgagtg gggcgcctg agccccgagc tgctctggca gctcctgcaa 660
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 ggtcgcgc 728

<210> 45
 <211> 367
 <212> DNA
 <213> Homo sapiens

<400> 45
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 ggcatgaagc agagctgtgg gacagggtgc caggggtggc cccaggggtc atgtgtgtct 180
 tcaaccatgc tgcgtcttcc accgcaggct tcataccttt tgtactttta tacgtggact 240
 gcagaccact ttgtgggagg gcagtgcacat atcagcacac agactcgatg gctcgtgata 300
 ttctgtgtga cagcctggag gctctcacac tcgaggggaa gagctgttag ttcataaac 360
 ctgctgg 367

<210> 46
 <211> 664
 <212> DNA
 <213> Homo sapiens

<400> 46
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 gaataaacat ggtgaagtca ggtttgctgg taaaggggag acagtactaa acgccctgcc 120
 caacaaatcc tcaaatcca gggttttcat atttctccat ggttcaatct ctcacaggtc 180
 actttccatt caaaggatta tggagaccaa ataagacagg attctttcag gtatcaacct 240
 agagtcttta ggtcttctct cagccaaggc atcgagtga aatacaattt atttttcgga 300
 ttctcttgga ggattaaaaa gtttctttcg cattgcaatg ccatgctccc tgccttgggt 360
 cctgttttct acctactcat tcttcaggca ttttctcaac tcccgatcaa cattcattac 420
 aataacccaa aaatttcaga atgttgatg ttttgtgaca ttccttaagc aagttaatca 480
 agacgttgca ttcttcagtg tgcaagtgtg gagataagtc aggatgcac tttaggagat 540
 gaggatggat cacagcagt caaccgcact cgtggccaca cggggagaac tgaagcggca 600
 gtagccggcg gagacgcccg acccgaggc cggctgctag ggagcagaca gctgaaccgc 660
 ttga 664

<210> 47
 <211> 839
 <212> DNA
 <213> Homo sapiens

<400> 47
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 cgcagacttc tcccgacacag ggctcgcaaa gagcgtgatt ccgagagcct gagactgacg 120
 cccgacctgg aaaccagaga agacttcctt agcctttcgg atcgacttg aggtggagg 180
 catgagtcct gtgaggcgtt ggggcagccc ctgccttttc cccttgacgc tcttcagcct 240
 ctgctgggtg ctctcagtgg cccagagcaa aacagtccga tacagcacct tcgaggagga 300
 tgcccccggc acggctcatcg ggaccctggc caggagacct catatgaaag tatcgggtga 360
 cacaagcttc cgcctgatga agcaattcaa cagctctctg ctccgggtgc gcgaaggcga 420
 cgggcagctg accgtcgggg acgcccgcct ggaccgcgag cggctgtgtg gccaggcccc 480
 gcagtgcgtg ctggccttcg atgtggtcag cttctcgag gagcagttcc ggctgggtga 540
 cgtggaggta gaggtaggg acgtcaacga ccacgcgcg cgttcccca gggcccagat 600
 cccggtagag gtgtccgagg gtgcggcagt gggcacgcgc atccccttgg aggtgccggt 660
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 ctctcgctg gagctgcaga cgcgagcggg cggcgctcag tgcgcagacc tgggtgctgct 780
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<210> 48
 <211> 683
 <212> DNA
 <213> Homo sapiens

<400> 48
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 gaccacagat gacatccttg tggcctcagc agagtgtccc agcagatgat aggacattga 180
 cccctgtgag ccgagctcag ccaaccacac cccagcaggc ggcagagagc cgtatccagg 240
 ctacagcaga gtgatccggg agtcacagcag caccacgggt atggctcgtt ggatagtagc 300
 cgctgccgcc ctgtgcatcc ttatctctct ctatgccatg tacaagtaca gaaaccggga 360
 tgaaggctca taccatgtgg acgagagttg aaactacatc agtaactcag cacagtccaa 420
 tggggctggt gtaaaggaga aacaaccacg cagtgcgaaa agctccaaca aaaataagaa 480

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aaacaaggat aaagagtatt atgtctgac ccaagatctt aaatggacac ttgtatagaa 540
atagtcttca ttttatctga gacataatat aaacttattt actttccttt ttatgaagca 600
catacaaaag aagacagaga atgcaatcag gaaggaaaga ctttttaaaa aataaaaaaca 660
agtatctcat gctcttgttt ccc 683

```

<210> 49

<211> 601

<212> DNA

<213> Homo sapiens

<400> 49

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agacgagggt ttcgctatgt tcgagaccag gaggtctgac tcgaactcct gacctcgtgt 120
tccacccacc tcggcctccc aaagtctgtg gattcctggc gtgagccacc gcgcctggcc 180
aggatgcccc ttttttaaag gctcaactgt cccagtaggc catgccatgt gggcatcggt 240
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tgccgggattc cccaggcttg ccgcgcggct ggacctctcc ctggccgtcc cctgcgcgag 360
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catctagggg cagactgtcc actgatgaca gcccgtggcg ccagggggtc caactgatct 480
tgagtgaacc cctggagaag ctgtcgaggg agctgccaga agccgcagcg gctgccccgt 540
cgggtgcttc atacgtgctg tgggaccggc ccgcgcacgc gcactcgtg agcgacctgc 600
a 601

```

<210> 50

<211> 412

<212> DNA

<213> Homo sapiens

<400> 50

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gcaaaaaaga cccccaatag gccgggcgcg gttgctcac cctgcaatcc cagcactttg 60
ggagaccgag gcgggtggat cagcaggtca ggggatcgag accatcctgg ctaacacggt 120
gaaaccccg tctactaaa aatacaaat ttagccgggc gtggtagcag gcgcctgtag 180
tcccagctgc ttgggaggct gcggcaggag aatgggtgtg acccgggagg cggagcttgc 240
agtaagcaga gatcgcgcca ctgcactccc gcctgggtga cagagcgaga ctctgtctca 300
aaaaaaaaga ccgccccccc caatatacac acaccctgac tttaatgagc ttattttgct 360
ggggactcag ccaattaatt tcacaaattg taaaactatt tcaagaaatg ag 412

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<210> 51

<211> 664

<212> DNA

<213> Homo sapiens

<400> 51

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ctaggactga cccttggtgt gtttttttgg gtggtggctg gaaacagccc tctcccaagt 60
ggcagaggct cagcctggct cccttccctg gagcggcagg gcgtgacggc cacagggtct 120
gcccgctgca cgttctgcca aggtggtgtg ggcgggcggg taggggtgtg ggggcccgtct 180
tcctcctgtc tctttccttt caccctagcc tgactggaag cagaaaatga ccaaatcagt 240
atttttttta atgaaatatt attgctggag gcgtcccagg caagcctggc tgtagtagcg 300
agtgatctgg cggggggcgt ctacgacccc tcccaggggg gtgcatctca gccccctctt 360
tcctgctctc ccgtccagcc ccagccctgg gcctgggctg ccgacacctg ggccagagcc 420
cctgctgtga ttggtgctcc ctgggcctcc cgggtggatg aagccaggcg tcgccccctc 480
cgggagccct ggggtgagcc gccggggccc ccctgctgcc agcctcccc gtccccaaca 540
tgcatctcac tctgggtgtc ttggtctttt attttttgta agtgtcattt gtataactct 600
aaacgcccat gatagtagct tcaaaactgga aatagcgaaa taaaataact cagtctgcag 660
cccc 664

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<210> 52

<211> 434

<212> DNA

<213> Homo sapiens

<400> 52

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cagagctgtc cgcgggctgg gcagcgtcgc cgtctcccct gagccgcctc ggtccggcag 60
gagcggagcc gaagcatccc ttgctgcacg cagggcagag caggcgaggg ctggggggcg 120

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atcgggggacc ccggcatctg gcagtttccct tgcagggttca actttaattg ccaagatttc 180
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cagcggctgg gcttggtccc aggagcaggg agagtgcgct cccggccctc ctagccgcgt 300
gccccggcca tgggtgcggct gagccccgcg cttgggtgag gcggcggcgc ggctcggagc 360
ccggcggacc ggtctacggg acatcttccc ctgaggagga gtcttccctt ggggctgcgt 420
gccgggggcg agcg                                     434

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<210> 53

<211> 879

<212> DNA

<213> Homo sapiens

<400> 53

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aaattctttc ttagcaattt tataagaatg ataagcattt tcctaaatat gaaaaatgta 180
ttgttgattg tacttcaaaa tgttattgat ttagtataaa ctgagatttg taatttaaac 240
tctagatgtg taaattttca aattataata tagtttaaag catgggtttc caaccttttg 300
gcttccttgg gccacattgg aagcagaatt atcttggggc acacataaaa tacactaaca 360
ctaattgataa ctgatgaact ttaaaaaaaa ttctataaat aatttttatg atagctactg 420
caacagataa gtgaaatgtt cttacattca tagcattggg caccacttga ttaaagtatc 480
tactcacctt caagatttct taaatgcact gtcattaaact agcttagaac actgctaagt 540
gtatattatt atttcttaat aactattatc ttatactttt agtaagaagc ctactggggg 600
ccgggcgcag tcgctcacgc ctgtaatccc agcacttttg gaggtgagg tgggtggatc 660
acctgaggtc aggagtgcga gaccagcctg gccaacatgg caaagcccg tctctactaa 720
gattgcaaaa attggctggg cgtgggtggc ggcacctgta gtcccagcta ctcgggaggc 780
tgagggtggg gaatcgctgg acccgggagg ccgaggttgc agtgagccga gatggcgcca 840
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<210> 54

<211> 773

<212> DNA

<213> Homo sapiens

<400> 54

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gtccggagcc tagccgtcgc gtacctagga tgccgcgtgg aagccgaagc cgcacctccc 60
gcatggcccc tccggccagc cgggcccctc agatgagagc tgcaccagg ccagcaccag 120
tcgctcagcc accagcagcg gcacccccat ctgcagtggg ctcttctgct gctgcgcccc 180
ggcagccagg tctgatggcc cagatggcaa ccactgcagc tggcgtggct gtgggctctg 240
ctgtggggca cacattgggt caagccatta ctgggggctt cagtggagga agtaatgctg 300
agcctgcgag gcctgacatc acttaccagg agcctcaggg aaccagcca gcacagcagc 360
agcagccttg cctctatgag atcaaacagt ttctggagtg tgcccagaac cagggtgaca 420
tcaagctctg tgagggtttc aatgaggtgc tgaaacagtg ccgacttgca aacggatttg 480
cctaataaag aagttcaacc tggagagatg gaaaatcagc tctcataact aagttaat 540
agtataaaaa tagaattgat agtgagggtg taaagtgtaa ccatcagtta aacctctcct 600
gtcattccta gcttccttgc ttcagaattg aaatggaggt gggggtgtcc ctactctgta 660
gaatctggga ctgggcaaat gtttgtgtgg cctccttaa ctactgttta tggtatgatt 720
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<210> 55

<211> 596

<212> DNA

<213> Homo sapiens

<400> 55

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ccaagctggc gtgcagcggc atgatctcgg cttactgcaa cctctgcaa gtgagttaat 60
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cggcatagaa tttaggacct gagattgttt cccactccc agcttttgct ctgcctattt 180
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cgctgtgtgt gccagctgct taggaggctg aggcacgaga atcacttgag cccaggaggc 480
agaggttgta gtgagccgag atgggtgccac tgcactccag cctgggcaac aaagcaagat 540

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tccatctcta aataaataaa taaatacata aataaataaa aatatttaga agacat 596

<210> 56
 <211> 380
 <212> DNA
 <213> Homo sapiens

<400> 56
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 tgcagttcct gctcccacgc atgaagcctg ttctgcccgc gcagcccctc ctgaggagct 180
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<210> 57
 <211> 767
 <212> DNA
 <213> Homo sapiens

<400> 57
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 aataagggtg tatctcattg tgggtttggg ttgcatttcc ctcatggta gtaacgttga 180
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 ccatttctac taaaactgca aaacgtagcc cgggtgtgtg gcgcagctt gtggtcccag 660
 ctgcttgagg ggctggggcg ggagagtcgc ttggggcccg gaggcggagg ttgcagttag 720
 ctgagattgc accactgcac tccagcctgg gcaacaaact ccctctc 767

<210> 58
 <211> 358
 <212> DNA
 <213> Homo sapiens

<400> 58
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 gctgctgctg ctgcgcgcgc tagccagcgg ggactatgtt cctgggctcc ggagcgtttc 180
 ccgcagccgc gacccccgct gctcacgcgc ctgcagcagt ccgctggcgg cgcggccact 240
 gagggcgccg ggagccgaag ccgcgaactc gctccctccg cacaagccg gagccggcgg 300
 cgcgcggggg gccgggcagc ggccgggcgc gacgggcggg tcgcgcgcgc cggggggt 358

<210> 59
 <211> 517
 <212> DNA
 <213> Homo sapiens

<400> 59
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 cctgccccgc cgcagtgcca gccagtggca agctgcccgc cccactctcc gggcaccgtc 420
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 cacacgcagc gttttgataa attattggtt ttcaacg 517

<210> 60
 <211> 386
 <212> DNA
 <213> Homo sapiens

<400> 60
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 tggtaatcct gctcagtag agaggaaccg cagggttcaga catttggtgt atgtgcttgg 120
 ctgaggagcc aatggggcga agctaccatc tgtgggatta tgactgaacg cctctaagtc 180
 agaatcccgc ccaggcggaa cgatacggca gcgcccgga gcctcggttg gcctcggata 240
 gccggtcccc cgctgtccc cgccggcggg cgcggcccc cctccgcgcg ccgcgcgcgc 300
 gggaggggcg gtgccccgc gcgcgcggg accgggggtcc ggtgaggagt gcccttcgtc 360
 ctgggaaacg gggcgcgcc ggaaag 386

<210> 61
 <211> 428
 <212> DNA
 <213> Homo sapiens

<400> 61
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 ggagcggctc attgacaagg ccatgaagaa agatggactc gtgggcatgg ccatcgtggg 120
 aggcattggc ctgggtgtgg cgggactggc cggactcatc ggacttgctt gtccaagtc 180
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 aaaaacggggc tgtggccttg gaaaaaaaa aaaaaaaaa aaaaaaaaa aaaaaaaaa 420
 aaaaaaat 428

<210> 62
 <211> 557
 <212> DNA
 <213> Homo sapiens

<400> 62
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 gaccctctc cccacaacgg ggcgcgcgc gcctggctcg ccgggcgcac tcccagcgcg 480
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 ccaccgcgac cgccact 557

<210> 63
 <211> 824
 <212> DNA
 <213> Homo sapiens

<400> 63
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 gcctctgtta cctgcatccc ccaactccaa ctttctgct tctccctctc cttttcaaag 360
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ggctcctgac ctcaggcggt acaccacact cggcctccca aagtgtctggg gttacaggca 720
 tgtgccacca cgctcaacca gtattttctca ttttcttcta ataaaccttc tagagtcca 780
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<210> 64

<211> 570

<212> DNA

<213> Homo sapiens

<400> 64

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 tatcttgagt atcttaggtt gtcttataaa ataaatttga agtagatgag ttataactca 180
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 gaagcctaac aaaaatagaa tattaatttt ctttaaaaaa ttaaacattt gaaaaatgta 360
 attcacagca ttaagtagac tgcataagtc ctcagtgaag ggaccctgaa gaagcatttt 420
 tttaaacctt catcatagtt agcagtgcga aacatagact tatcagacaa aaatcaacta 480
 aaatgttaat tttgaaataa ataactaaca tagaaaataa aatgaggtca ttgttctcta 540
 ctccgtagat cttagagtct gccttagaaa 570

<210> 65

<211> 424

<212> DNA

<213> Homo sapiens

<400> 65

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 ccgccccttc cgagacccca gccgggctgc cgcccgctc ccggaagctc cagcctgaac 180
 catgttttct acttgtggcc caaatgaggc catggtggtc tccgggttct gccgaagccc 240
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 gatctctctc aacacactga ccctcaatgt caagagtga aaggtttaca ctgcctatgg 360
 ggtcccatc tcagtcactg gcattgcccc ggtaaaaatc cagggggcaga acaaggagat 420
 gttg 424

<210> 66

<211> 467

<212> DNA

<213> Homo sapiens

<400> 66

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 caggccaccg cggcgctggg gtccataacc tgatgctgtt gtcccccctg ctggtaaggc 180
 ttaattggcc cctggtggca acgcgcgctc cggatcttgc cgccaccgcc ccctccgact 240
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 gggcgggaga ggcagaggcg gaggccttag agagcctccc cggccgcccg gcccggggcc 360
 aaaagtccgc ccgcgctgtc cacacagtgg gcacaagcac ccaggaacc gcgaggttgc 420
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<210> 67

<211> 395

<212> DNA

<213> Homo sapiens

<400> 67

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 atctaactct tctcactggt ttttctttgc aaattcattt gcttttattt ttctaataac 180
 aataaactct attttccatg ttctcagggc ccctgggtag acagacacag cttgatttca 240
 gagcagacat aggcgaagaa aacatggcat tgagtgtgct gagtccagac aaatgttatt 300
 tatatacaca tccaaatttg aagagaaaat gtatttcttt aggtttcaaa cactgtaata 360
 gatataaagc aaaaataaaa acctgttgca aagtt 395

<210> 68
 <211> 780
 <212> DNA
 <213> Homo sapiens

<400> 68
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 ttccagagga tgaggcgctg atgcttcggg atggacgctt tgcttgtgcc atctgcccc 180
 atcgaccggg actggacacc ctggccatgc tgactgccc cegtgcaggc aagaaacatc 240
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 caaaacatca gaatgaattg agaaggggaag aaacaaaaac tgaggctcct ctgctaactc 360
 agacacgact tatcaccag agtgctctgc acagagctcc ccactataac agttgctgcc 420
 gccggaagta cagaccagaa gcccttggtc cctctgtctc cctttccct atgccacct 480
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 aggccgagga gtcagcaact gtccacccc ctgcacccat gagccccaca agaagacgag 600
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 gggtaaaaaga tgaatatgtt gaggtttgact ctgatgagga ggaaccacct gatctccct 720
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<210> 69
 <211> 698
 <212> DNA
 <213> Homo sapiens

<400> 69
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 gattaaaaaa aaatattttt acacagttta aggttaactc taacagaaca tagccttgtt 180
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 ttgtgatccc tgtccatcat gcccgcgtcg gccgtgccct gccatgaccg gtcacacctc 480
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 tcgtcctacc tcttgtcaga gccatagccc cccagccat cgcgggagtc ccggccgtgg 600
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 cttgaacctt ctctcctgtc caccgagtgg tcggggta 698

<210> 70
 <211> 567
 <212> DNA
 <213> Homo sapiens

<400> 70
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 acactgttgt tttggaaatg tgcttccctc catctgaaat ctcatccctc cccccgcca 120
 ctccggcagc tgtgctgtgg gcaggcatg cgctccctg gctgagcacc ccagagattc 180
 tcctgcacct tcctcatgcc gcacgctgct catccgtctc catgtgtgtt tagatccatg 240
 ccattcactg actcactaac acctgcaaaa tctttaagga aaaaagctga agggtagcag 300
 catgcacata tgtgacctgg aaaatgcaaa tttagatctt ttatgattta attgttattg 360
 tttcccatag aagttccctc cctttgaaat taatatataa tgtataaatt ctgcactgag 420
 ccattggcga gctgggcagc ccctaggtta gaggggagac ggaggcccag gcgcaggggg 480
 cacacctcat ctggtttctt tcccatctca cagcttagct tgtgcttctc aacaccaagt 540
 ctttaagagc aataaaaaact acaccac 567

<210> 71
 <211> 527
 <212> DNA
 <213> Homo sapiens

<400> 71
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gccccaggag aggaagtcct ttaagtcctt aggattttta gatgttgaaa atactccctg 120
cgccccgcat tcaatattgt atggttcatt aggatctgtt gtggctggct ttggacattt 180
tttgttcact agtagaatta gaagatcatg tgatgttgga gtaggagggg ttatcttggt 240
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aattgccaga gaagaaatta aaaagaagat attatatgaa ggtaccacc tccatcctga 360
aagaaaacac aacggcagca gcagcaattg aacaatcttg agcatagaag tcaatgtaaa 420
cgaagtaaga tcaaccacat aaaacatttc atgtgcaata agctctcaat caagtaataa 480
aagtttaagt tgtagtcaaa aaaaaaaaaa aaaaaaaaaa aaaaaaag 527

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<210> 72

<211> 427

<212> DNA

<213> Homo sapiens

<400> 72

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tgaaattgtg cattgactcc atgaacaagt taatactgtg agactgccac cctgtggaca 300
aaatatcagg actaaaacca tcaagaatta aagtttcatt catttgcat ttactgtttt 360
agaactggct ttggttcttc caggttggtg catgcagtga tgctcattaa atagaaagct 420
tgaaatt 427

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<210> 73

<211> 817

<212> DNA

<213> Homo sapiens

<400> 73

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tggactacag gagaaaagcc cacctcgcac ccgacgccc aacagcacc tggcccaggc 120
cctccactgg actcgtcttc agctgtctcc cctggaggcc ccgcccctgc tctgggggct 180
cctcatggcc gtgggggctg tcagatttgt gcaggccctg ctaccacct gttctctccg 240
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caccggcgga aagaagtagc tgtgttctcc cagctgcacg tcttgagagg gccaggtcgc 420
cgggagtgct ctggcctccg gcaggacagg acccagccac tgtgccttag ctgacctgc 480
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ggtctgagtc tagagcccc aaccctaggc cccgtgccag aggggaagag gctgactccc 720
aggggaagag gggaaagcact gtcattctcc acgtcatctt cacaccagcc catctgccc 780
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<210> 74

<211> 511

<212> DNA

<213> Homo sapiens

<400> 74

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agcgacgctg agctgctcct ggccgcatgc accagcgact tcgtaattca cgggatcatc 120
catgggggtca cccatgacgt ggagctgcag gagtctgtca tcaactgtggg ggccgcccgt 180
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tccattcgta cccactgcg ctgtggcgtc caccggggcc caggcacctt cctcttcctg 300
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cgtgectacg aggtgcccc tgctgcccac ctccaccctt gcgaggtggc gctgactga 420
ggggctgggt gctggggagg ggctggtagg agggaggggt ggccccactg tttggagggt 480
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<210> 75

<211> 792

<212> DNA

<213> Homo sapiens

<400> 75

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acatcagggt ttttcttttc atggcagatg atttaccag gaaaagggtta cctcagctgt 180
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gaaaaagagt tttagttaaa atatgtatga aatctgatat ttagatatca taaaatgcag 540
tattcgctgg gcacgggtggc tcacgcctgt tatccagct ccttgggagg ccggggcggg 600
cggatcgctt gaggtcggga gttcagagacc agcctgaaca acatggaaaa ccccgctctt 660
actaaaaata gaaaatcagc tgggcgtggt ggtgcgtgcc tgtggtccca gctgctcagg 720
aggctgaggt tgcggtgagc tgagatcgtg ccattgcacc gcagcctggg caacaggagt 780
gaaactccat ct 792

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<210> 76

<211> 452

<212> DNA

<213> Homo sapiens

<400> 76

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cccagatgcc tacgggaagg agctgtttga caaggccaac aaacaccact tcttacacag 180
cctggccctg ttaggggtgc cccattgcag aaagccactc tgggctgggt tattgctagc 240
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ctctttgagc tcccttttgc ttaattactg ggttttctgg gcagtttttt ttttaaagag 420
ttggagtaag aagaggatta aaaaggaaag ac 452

```

<210> 77

<211> 442

<212> DNA

<213> Homo sapiens

<400> 77

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aaaaagtcct acttttctgg gtccccaggt gcagcacctc ccggagactg tttctcccat 60
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gggtgggagc gagccccagc acagactggg ggggtgctcac agcaggggcca ccttgatgca 180
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aaacacagat tggtagcacc cg 442

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<210> 78

<211> 704

<212> DNA

<213> Homo sapiens

<400> 78

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ggaaatcacc tttctggtct tagtctcccc atctgaaaat ggcataacca acctacctgc 60
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ccggtgagct agtctccgct cgctcggatg cacttgctgc gccccgccc cgcgagacc 180
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gtgcggggag gggagtgggg ggatctctct gagatacttc tgccttgggg tcaactggatc 600

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attcattcga caaacatccg cgagcaagnn aggaactagg agtcattcctt gccacctccc 660
tctccctcgc tgcctatatt aaaatacacc tccatttcct gtcg 704

<210> 79

<211> 644

<212> DNA

<213> Homo sapiens

<400> 79

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ttggataatt caattgcaat aaattgctta ttctgtgcc tccc 644

<210> 80

<211> 396

<212> DNA

<213> Homo sapiens

<400> 80

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gcggtcccg gactgtgtgg ccggggactc agcgggtccga gtccgtggca gtccggacgg 180
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cgcttcttc ctgccgtggc cagcgcggcc ggcgctggtg ctggtgtggg agagtggcct 360
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<210> 81

<211> 852

<212> DNA

<213> Homo sapiens

<400> 81

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agacctgtc tc 852

<210> 82

<211> 651

<212> DNA

<213> Homo sapiens

<400> 82

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ccccgtgtat ggccccctg cacctcctt tctcatccc gaagatccgt cccctggcc 600
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<210> 83

<211> 892

<212> DNA

<213> Homo sapiens

<400> 83

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<210> 84

<211> 469

<212> DNA

<213> Homo sapiens

<400> 84

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<210> 85

<211> 791

<212> DNA

<213> Homo sapiens

<400> 85

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<210> 86

<211> 770

<212> DNA

<213> Homo sapiens

<400> 86

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<210> 87

<211> 800

<212> DNA

<213> Homo sapiens

<400> 87

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 cggcctcggc gtccgtctcc agcatgggccc gcgtactctg gcaggaggcg aggtcacagc 720
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<210> 88

<211> 861

<212> DNA

<213> Homo sapiens

<400> 88

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tcattgcttc tcttaattta tttacctgga atcaacttaa tcctgtgtgt taggctgttc 780
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<210> 89

<211> 636

<212> DNA

<213> Homo sapiens

<400> 89

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<210> 90

<211> 827

<212> DNA

<213> Homo sapiens

<400> 90

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<210> 91

<211> 672

<212> DNA

<213> Homo sapiens

<400> 91

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<210> 92

<211> 435

<212> DNA

<213> Homo sapiens

<400> 92

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ccctggcgcc cctggcgcc cctccgctgc cgtgggtgca gctggagtgc gtggactacg 420
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<210> 93

<211> 829

<212> DNA

<213> Homo sapiens

<400> 93

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tccagctac tcaggaggat tgctggatcc cagaagtcca aggtgcagt gaatcgtgat 780
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<210> 94

<211> 336

<212> DNA

<213> Homo sapiens

<400> 94

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tgcccttgaa cagaaaaccc tgacccaga ccagtgggca cgtgagcgac agaaatgagg 300
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<210> 95

<211> 542

<212> DNA

<213> Homo sapiens

<400> 95

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 <213> Homo sapiens

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<210> 97
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 <212> DNA
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<400> 97
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 <211> 630
 <212> DNA
 <213> Homo sapiens

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 <212> DNA
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 caggcagctg tgccctgacc cacagggacc cgtggggatg ggaggaggctc caggcctgtg 360
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 agtacaaaaa aatcttgttt tggccttaag aagggttag tgcattcttc aggggtcact 660
 ctgccatggg gataaaatag ctgtttcaca aacagtttta tttaaaaaaa caaaaaacaa 720
 aaaaaatcaa aaaaaatcaa aaataataa acttcatttt aacctcg 767

<210> 102
 <211> 713
 <212> DNA
 <213> Homo sapiens

<400> 102
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 tatagaaata tccgcatcca gccatgtgct gacagacca atgtaaaatg ttcagcaggt 180
 tttccaatgt ctcttgata tatttaatca tctctgcaga agaactcaaa atctcagagc 240
 agctccactc cagatccagg gcaggaggca gcctccaggg agggaggctg cgtttacgag 300

```

aatctgcctt ttgtgtgtgc ctggctggga ccagcctctg ggaaagagaa gcaccaagac 360
gtgaacaggg ctgtgggccc atggctttag cagccacata atccctcctt tgatgtccag 420
ggtcagttcg agcctggccc cccaggctag gaggagacga atgaaagaat cttgctgtgg 480
tctttcctcg ttaaaataac atttcggcca ccacctgggc tgaggaccta tccatctgct 540
ccttggtccg ctcgaagcac ctacggcgga gctgctgctg tctggcgtcc tcaactacca 600
tcagctcccc gtagaggtag acacccatgg ccacggcgag agcctgtgtg gcattacaga 660
cacgggactc ctgccccgca aagtgtgtcc ctaggagtag ctggctcttag aaa 713

```

<210> 103

<211> 478

<212> DNA

<213> Homo sapiens

<400> 103

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atggccgctc cgagctggag ctactgaagc tgcgtcggc ggagtgcac gcagagggcg 180
ccgagcggtc gggggccctg agcgcgcga tctggagcca gcccagctg gcctacgag 240
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gggcagtgca gccgcactac cagctgcca cggccttcg cggcgagtg gagccgcgg 360
agggccgggc accgagcgcc acgccacgcc cgctgcacct gggcttcctc tgcgagtac 420
acgcgctgcc cggcatcgcc cagcgtgcgg ccacaacctc atcgctgagg tcggggcg 478

```

<210> 104

<211> 686

<212> DNA

<213> Homo sapiens

<400> 104

```

tgcttgggccc cgcttgccct ggagtgtgta tgctgggttaa ataagaaccg cctggcgag 60
gctgtgtcta ctcttcacgc cgcttctca gatcgggctg catgtcccca ctccgtgtt 120
acatctcgtt cccgctccgg gtctcgggtga ctggctcctc aagccggaga cgcgtgtgt 180
gcggcgcat gggggcgcca gcgctgtgtg tgctggcggt gcgctgcctt agtgcgggg 240
aaagtggagg gaacggtcct gggggcggt ctgtccaaga aaaaggactg cagcctcggg 300
gagccagggc cccctcgag acgagctgcc aacgcgcgg agccatttct gttccacct 360
aggggaggag taggggata tcttttaaaa gttaattgc aaaataagta ggttagtaag 420
gccatttgtg gttgctgtt cagtaacttc agcagtcaac ggagagaaga gtgaaacct 480
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agtgtgtgt atccaaaaaa aaaaaaatc gtacaatgta ttttaaaact tgtgtgcaca 600
aaactgaaga ttttctttt tacctagtcc aaatgccgtc ctacgctgag tcctgctctt 660
tataaaaata aaataaaaag aatttg 686

```

<210> 105

<211> 808

<212> DNA

<213> Homo sapiens

<400> 105

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ctttctgctg ccccggttgt tggcgctggc tgcgctggca gccgcccag caggggccc 60
gctggcattg gtggccggcg tgctgggtgct cgtggcttcg gcgctgcgat ccgcctacat 120
gcttaccgac ccttacggct cgcaggcgcg gctggcggtt cgcggggggc tgggtgcteta 180
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cctgggtggg gtccacttct ggtgcgcttc ctggagcaaa caagggcgct cgccttggcg 480
ttggccggcg tgggtccggc agaccagcc cggccacgga gcacgcttgc tgggctaaga 540
tgatgtgtct ggcgtgccc gcgcgtcagg aaagagcgag gtgcgggagc gacccaataa 600
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ccgcaaccgc gcggagagtg ggcagctggc cagcccgagt tcaggcgctt ggggctcggc 720
tgctcgttg ggtcgggac cccagggtgg cccgggactg tcccgaacg gtgtgggacc 780
cggcgccatc gctgagcgag ctggatct 808

```

<210> 106

<211> 493

<212> DNA

<213> Homo sapiens

<400> 106

```

cacctccctt acctgtacca cctcctgtgt catcagcagt ggcctggatg acctcatcag 60
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tgcaagcttg ggtgtcatct cagacaacct gctgggtgact ggcggccagg gctgtgtctc 180
cttttgggac ctaaaactacg gggacctgtt acagacagtc tacctgggga agaacagtga 240
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cagtgaagctc agcctgggtg atgtgccctc tgtgctggag aagctggact gagcgagg 360
cctccttgcc caggcaggag gctgggggtgc tgtgtggggg ccaatgcact gaacctggac 420
ttgggggaaa gagccgagta tcttccagcc gctgcctcct gactgtaata atattaaact 480
tttttaaaaa acc 493

```

<210> 107

<211> 427

<212> DNA

<213> Homo sapiens

<400> 107

```

tttccttctg gggagagagt gcccccccta ccatgtagtt gaacaggggc taggagctcc 60
ccactccctt cctcctaaca gcaggctgtg tgggtttcaa tccccatcct tcccacccc 120
gctagggtgc gtccacctg tctcctgtgt ctgagtgtgt gtgggggggt tctgtactaa 180
tttccatggc cgggtggcttt tccttccatg catcactccc ccccgcatgc ccaggggcca 240
cccgcctggc attaccgcat gctgggggtca ttgggggagg ggggtggggc tcacgctgtc 300
ctgtggctct gagattttta tttttgcata tgtaatccat tctgtacagg tagctaactt 360
tgtaaacgct gtgtattccc tctgccccca tggctgctgg tgtaataaaa ctgcatctcc 420
cgttgat 427

```

<210> 108

<211> 729

<212> DNA

<213> Homo sapiens

<400> 108

```

ggactgcccc gcctgtgtcg ggggctttca ggggtttcgtg ggggtttgcc ggaaggcggc 60
tttcctcccc ctggtgtgag gtgcgcgccg aggcttgtac ccgctagtga ggtgtttgag 120
ctggctcagca aggagagggg gtgggggttc gcggaagggt ctggaggggt cttggtaggt 180
ctgcagtga cgcctcctgag aatggagtgg ggtcccatgg tgcaggctctc tgagcaaggc 240
ggaggtgtgg aggagaggcc ggcttggggg ggggcctcgc gccctagtgc cggccggcct 300
cagcccggt ctgcctgggtg ctccctgcag tgccttctcc atggccccgc cctcccccg 360
tgtgcgccag gcttgggggtc cccgggagag cagagcttgc gcctcgggca tagggacgtg 420
gggtgcaggc gccaacatca gtggcagcag ccaggggcgt ggtccagtcc cactcgggga 480
tggagtgggc cggcggccaa accagtcact cggggaggaa tgcggaggag cgctcattcc 540
attctattta attgcagtgt acaaaattgt gtttgtatat agaataaact gtctgttgac 600
agcgaaaaaa aaaaaaaaaa aaaaaaaaaa aaaagcggcc tgatattcac aggggctccc 660
tacagaccaa gcaaatttaa tgggaaaaga acacttgact tcataaagaa gaaattttaa 720
atatatttt 729

```

<210> 109

<211> 816

<212> DNA

<213> Homo sapiens

<400> 109

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taggctcttt cggccaaaaga ggcctagaca gcctgtccat cctgtcattg aagtgggtc 60
ccaagccttt gccactcca gccacagcag acatcacttg tgtgtgtaag ttgaacacat 120
tttactgtaa aaacaagagc catggtgtct cagaacagct ctagtctcc cttggctgtg 180
cctgatggag gcagaggaca agatgggtca gcatgtaacc ctttcctacc gcagagccat 240
gccttcactt aatgccccaa aagggtgcag cggatgtga accccatag gctgactcct 300
ggggggcccc gccagggcag ggtgtgtgtg tgcagaataa gcagggccag ggcctgccc 360
tggcatggct cagcagagcc ctccctccct ccacctcca cctgctgcc ttcatcccc 420
aggcgctgaa gtatgccttc cagaccacg accgcctgtg ctttgtgatg gattatgcca 480
acgggggtga gctgttcttc cacctgtccc gggagcgtgt cttcacagag gagcggggcc 540

```

```

ggttttatgg tgcagagatt gtctcggtc ttgagtactt gcactcgcg gacgtgggtat 600
accgcgacat caagctggaa aacctcatgc tggacaaaga tggccacatc aagatcactg 660
actttggcct ctgcaaagag ggcatcagtg acggggccac catgaaaacc ttctgtggga 720
ccccggagta cctggcgctt gaggtgctgg aggacaatga ctatggccgg gccgtggact 780
ggtgggggct ggggtgtgtc atgtacgaga tgatgt 816

```

<210> 110

<211> 582

<212> DNA

<213> Homo sapiens

<400> 110

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ggtgaggctc acgggtaact cgggtgggtgt ctgtgtgggt cgtgcacgat ggcctgcagg 60
ccctgagctc cagttagcgt gggcctgcgg ctccgtggga actgcaggtc tgggtcctct 120
gtgtgccccg gggccaggcc aaaaccaggc tggaaaccgc cggcaggggc cccgaggcgc 180
ctctgcctgc tctctcgtt cttgccggcg gcagcgatc ggactcccgc ttctgacaaa 240
gtctcagctc cgcagcagca cccggcgcg actcgtggg cgcgcggact gagctccggg 300
tggaaaccagg accctcgcgc cctcgccctc gccctcgccc tcgccctcgc ccgagctgga 360
ccaccgcgag caccgcccac gccagccgca gagccgcggg tgcgcgggga agaggaaacg 420
aaagcgcggg ctccggagct gaggtgagaa gtgagcagaa agtgaaaaga gaatccatcg 480
gaaacagata aaaaaggaaa aacaaaaccc actcgaaaag aaagaaaacg ttacaacaaa 540
aaggataaag taacgctaaa tgaaataaaa aggagacata ct 582

```

<210> 111

<211> 881

<212> DNA

<213> Homo sapiens

<400> 111

```

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ctacgccttt ctacttctca atctgatttc tatgaggttt ttttaaacga gcaatccttg 120
gctgcttctt tttcttaact ctttcagtag tgagagcagc ccctccacac tgaaaacacc 180
cagcactgtg acggagtcca gcctggttct gggtagcgtg ggccctgctc ctgcccactt 240
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ggaggtgcac agagtgtatg taactttttc ccgtgtgtag atatgtacag ccaaagggtc 720
gtgtaaatgt tctgcaaaag tgggtctata cagagtgaag gctatatttt ttgtgcagag 780
aaaaaagtct ggagggtatg aaccttcagg gtttattcat atttaagatg tagctttttg 840
ttgtttcagg cattatgtat aaagcaacga ttattttata g 881

```

<210> 112

<211> 813

<212> DNA

<213> Homo sapiens

<400> 112

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cacaccaca cctgagctgt tctcagtgct ggaacttgac catcctggaa caccctggaa 60
gaaaaaggag cgcagggtgg gccctcgccc tgatgcagga ggtgctgata gcggacgtgg 120
ccaggcagga ggggcccggg tcaggagctg agcaggggat gcctgtgctg ggtgctggg 180
tctagggaag ctccagcccc aggatggggc tgccctgcac accggtgccc gccacatgcc 240
aaccctcacc tccccgagga ctggatgatg tgctgccacg tgtgactcgt ctcccttgct 300
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tacgtgaggt gctctcctcc ctgccaccat gctcatcact ctggccttgg ccatgctccc 420
tggtcacccc acttcccggg cgcgctctgc agcactcctg gacagcctg ggcccttcag 480
cccctgtgct cgtcccaccc tagggactca gccacttgca gaacaggatg ggaccagat 540
ttcagcgagc cctcctggcg cccggtctc cctgtgggca ccagccctct tggtagctgg 600
tgtggaggcg cgggtctcct ggctgccacg gagggatttg atcaccgaag cagccacctg 660
ctgtagtgtg acctgaggtc agaggcgggg catcagaggg tcaagggtgt gagaagccac 720
cgggaaagca gccagcacaa agggcccagg aagccagccc ccgagagctg agcgtggggg 780

```

tctttgagtg tctttctcca agctgagacg tgg

813

<210> 113

<211> 604

<212> DNA

<213> Homo sapiens

<400> 113

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ggagaagatc aacaagatca agtggctccc acagcagaac gccgcccact cactcctgtc 60
caacgataaa actatcaaat tatggaagat taccgaacga gataaaaggc ccgaaggata 120
caacctgaag gatgaagagg ggaaacttaa ggacctgtcc acggtgacgt cactgcaggc 180
gccagtgtg aagcccatgg atctgatggg ggaggtgagc cctcggagga tctttgcca 240
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ggcggatgac ctgcgcatca acctctggca cctggccatc accgacagga gcttcaacat 360
cgtggacatc aagccggcca acatggagga ccttacggag gtgatcacag catctgagtt 420
ccatccgcac cactgcaacc tcttcgtcta cagcagcagc aagggtcctt gcggtctgc 480
gacatgcggg cagctgccct gtgtgacaag cattccaagc tctttgaaga gcctgaggac 540
cccagtaacc gctcattctt ctcggaatc atctcctccg tgtccgacgt gaagttcagc 600
caca

```

604

<210> 114

<211> 541

<212> DNA

<213> Homo sapiens

<400> 114

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ggaggaggga gctcgagagt tgtggagact agtgactggg agaagtcgca gcccgctcag 60
gcccgcgect tcccgctccc cgtcttctc tctcacacac ctactccgcc ctccgcccc 120
gcccgcgcg tagctcttc tctcgccgg gggtctctc ggtagctctc cgggtcttgg 180
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agctgggtgc gccgcttct caacgggcag gtggtattcg aggcgtggg ccgcttgcgc 480
ctgctggact tctcaacgt gaagaacgtg tacttcgcgc agtacggcga gcccgcgag 540
g

```

541

<210> 115

<211> 565

<212> DNA

<213> Homo sapiens

<400> 115

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ctcgcttctc tgcattacac gccggtcagg attcgcgacc cgacatggag cgtccccgca 60
gtcccaatc ctccgcccc gctctgcct cagcttcggt taccctggcg cagctcctgc 120
agctggtcca gcagggccag gaactcccg gctggagaa acgccacatc gcggcgatcc 180
acggcgaaac cacagcgtcc cggctgccgc ggaggccaa gccctgggag gccgcggtt 240
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tcttttatgc tttcgtcctg acctgtctca actagacttg ctctgcaac caccatgggg 480
gttttgcatc tacatttgtg gaccatgta cagttaagaa aaatcctgtt tcagtcctta 540
tatgtaataa aatgttttat gatgg

```

565

<210> 116

<211> 894

<212> DNA

<213> Homo sapiens

<400> 116

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cgcctctaag ttccgcgcgg gagccacgc gcggttcgtc cggaaccac agaccagaga 60
cgaggtccc agccttttcg gtgtcggcgc cagttcccg aggagcggac atgagtga 120
gccaggatga agttcctgat gaagttgaga accagtttat attgcgtctg cctctggaac 180
atgcttgatc tgtcaggaac ctacacggt ctcaaagtgt caagatgaag gataaactaa 240

```



```

aaattgactt attgcoctgat gggcgccatg cagttgttga agtagaagat gtccactagc 300
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aaccttttat aaaacagcag acattctcag atgcttgtgt tgcactgctg atggtgat 420
ccacctttct ccagaagaac cagctgcctc ttacpgatcc taatatagtc aggaaaaaga 480
aaggggagag aagaaaaatg ttntctggaa gcatggcatt acgccaccac ttaagaatgt 540
cagaaaaaaa aggttccgga aaacacaaaa aaaggtncct tgatgtcaaa gaaatggaaa 600
aaagcagctt tactgagtac attgaatctc ccgacgtgga aaatgaagta aagagactgc 660
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acaagcaggg tcatacctcg tcagggtactt tagtaaaggg aaagcaggag ttccagatag 840
ggcagggtatt gactgggtat cagatcattt tccataaatt cataggccaa tccc 894

```

<210> 117

<211> 807

<212> DNA

<213> Homo sapiens

<400> 117

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cagggcctta ggggctgagg cgcgatggca ggtgtcgggg ctgggcctct gcgggagatg 60
ggggcgaggg ccctgctgct tctcgcgctg tgcccacagg cgccaggggc tctacttcca 120
catcggcgag aacgagaagc gctgtttcat cgaggaaatc cccgacgaga ccatggtcat 180
cggtcaggcg ggctgagggc aactatcgta ccagatgtg ggataagcag aaggaggtct 240
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aactgcgggt gcatctcgac atccagggtg gggagcatgc caacaactac cctgagattg 480
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aacagattca gaaggagcag gattacaaa ggtatcgtga agagcgcttc cgactgacga 600
gcgagagcac caaccagagg gtccatgggt ggtccattgc tcagactgtc atcctcatcc 660
tcactggcat ctggcagatg cgtcacctca agagcttctt tgaggccaag aagctggtgt 720
agtgcctctt ttgtatgacc cttccttttt acctcattta tttggtactt tccccacaca 780
gtcctttatc cactgggatt tttaggg 807

```

<210> 118

<211> 799

<212> DNA

<213> Homo sapiens

<400> 118

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ccttgattat agtaggaagc tgaaaaatgt attagttacc atttactggc tgggaaaagc 60
agcaaacagc tgcacatcct acagcggaac gacactaaac ctgaaggaggt ttgaaggatt 120
gttggtctcag atgcgaaagg aactgatga cattgaaagt cctaaacgca gtatccgaga 180
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gcagagatga ttccttcgac agcctggatt cctttggctc tcgctctcgg cagacgcctt 300
caccagatgt agtcctcagg ggaagcagcg atgggagagg aagcgactct gaatccgact 360
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atggtgagcc gaaatcagca gtgcctttta accagtacct cccgaacaaa agcaatcaga 480
cggcctacgt ccccgcgctt ctgagaaaaga agaaagcaga gagagaggaa taccgcaaga 540
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ccgcggtgca gccgcacagc agggcccgcg agggagcagct gcagctgata aataaccagc 720
tgagggaaga ggacgacaaa tggcaagatg acctggctcg ttggaagagt cgtngaagaa 780
gtgtttctca ggacttaat 799

```

<210> 119

<211> 375

<212> DNA

<213> Homo sapiens

<400> 119

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ctcgacatgg gggaggccgg ggctggcgct ggcgccctcg gagggccgga ggcaagcccc 60
gaggcagagg tgggtgaagct gctgcccttc ctggcgccgg gcgcgcgggc ggacctgcag 120
gcggcgccgg tgcggcacgt gctggcgctg actggctgcg gaccggcccg cgcgctgttg 180
gcggggcagg cggcgctgct gcaggcgctg atggagctgg cgccggcctc tgccccggcc 240

```

cgggacgccg cccgcgcgct cgtgaacttg gccgccgacc ccggcctgca cgagacattg 300
 ctggcggccg accccgggct gccagcgcgc ctgatgggccc gcgcgttgga cccgcagtg 360
 ccctgggccg agggag 375

<210> 120

<211> 649

<212> DNA

<213> Homo sapiens

<400> 120

cactttttcag aaagacaggc aacgtgttg accttccgga gcatctcaga agacagaggg 60
 ttttcttttg agngagcaca acattttacc cactgacctg aaggacaggc caagcngaatt 120
 ggaagccttc tgaggcactg gagcagaagg gaaaacttgc acatggctgc aaaggacttc 180
 aactgtttcc atccccctcta cngccatcca agaggcctct tgactcttcc agaatacagat 240
 gtaaaagaca agggcagtg cactgctcgt cgttgctggg gatacattcg cagtgccaca 300
 cctcctccac cttctccacg gggtagacgg cttccaccta gtggcagatg agccgcagct 360
 gcgtaggggtc cagctgcttc ttgttgcaag cccgaaaatt gttgtactgc agctggaggt 420
 tctcggcggt ggaggagccc cgcggcaagg ttgccacg agaggctctg ctgcacgato 480
 ttgcacacct ccttgtcggg cagcagaaaa agtacttcaa ctccggccggg caccgtgggt 540
 caccgctgca cgctgtaat ctacgactt tgggaagccg agacgagcgg atcacgaggt 600
 caggagntcg agaccatcct ggctaacacg gtgaaaccgt gnttctact 649

<210> 121

<211> 761

<212> DNA

<213> Homo sapiens

<400> 121

gcgcgacccg ctccggggac agtgccaggt ggggagtttg actggggcgg tacacctgtc 60
 aaacggtaac gcaggtgtcc taaggcgagc tcaggaggga cagaaacctc ccgtggagca 120
 gaagggcaaa agctcgcttg atcttgattt tcagtacgaa tacagaccgt gaaagcgggg 180
 cctcacgac cttctgacct tttgggtttt aagcaggagg tgtcagaaaa gttaccacag 240
 ggataactgg cttgtggcgg ccaagcgttc atagcgacgt cgctttttga tcttccgatg 300
 tcggctcttc ctatcattgt gaagcagaat tcaccaagcg ttggattgtt caccactaa 360
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 gtgttgttgc catggtaatc ctgctcagta cgagaggaa cgcaggttca gacatttgg 480
 gtatgtgctt ggctgaggag ccaatggggc gaagctacca tctgtgggat tatgactgaa 540
 cgcctctaag tcagaatccc gcccgagcgg aacgatacgg cagcggccgg gagcctcgg 600
 tggcctcgga tagccggtcc cccgcctgtc cccgcggcgg ggccgcccc ccctccacga 660
 cgcncggcgg cgcgcgggag ggcgcggtcc ccgcgcggcg ccgggaccgg ggtccgggtg 720
 ggagtgccct tcgtcctggg aaacggggcg cggccggaaa g 761

<210> 122

<211> 369

<212> DNA

<213> Homo sapiens

<400> 122

aaaaaaacta taaaaaagaa agaattaa aactttcagag aattactatt tactttatta 60
 acttacggat ttattatata aatatatatt cacctagcaa catatctctg ccgtctctcc 120
 tgctctonta atgaagacat agccgattct ctgccggg cccttgctga tgctcctccg 180
 ggtctgcgtc gggcgtgggt cctgggggac cctccagagg tggaggtggg ctgatggcct 240
 ggctgcctgg tgggtgatgg ttttgcnc cctacctttt ttttttgagt ttattctgat 300
 tgattttttt tcttggtttc tggataaacc accctctggg gacaggataa taaaacatgt 360
 aatattttt 369

<210> 123

<211> 867

<212> DNA

<213> Homo sapiens

<400> 123

atctatggcc tggataggca ggaagggtt ggaccctgag ccccgagaa ggttgcata 60
 acgagtgggt tgaagcctgt tgggtagctt ggccactccc gcggcatggg tcacctgcac 120

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aggaggtttt gccaccagg gggcagcaga gggtcagggg gcaatggggc ctgggtggag 180
catgggcccc gcctgctgtg tgccaccctg ggtgtggcac ctgctcacat ccaggggttg 240
gtgcagggaagg agggcagang gtggccaggc acacctgaga gggggnaacc agaagcccc 300
gggacccagg ggccctgggc aagccccag aaacctgtt ctgcaactn tctgcngtgt 360
gcccgggcca cctctgggc tggcttcca tggggcgggg cggccaccct tctcaactca 420
ggtttccctg ggcngcagg gcccctcagc acccctgggg ttgcggaagt ggnccggggg 480
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agtccctccc ctgggcctcc ccggttctgt tgttctcctt tctttagttg tgggtggtgt 720
tgtgtgccaa gtttgcccc ctgccctcct gcctgggctt ctgtgcaaga ctctttcttt 780
gttcaaaaaa aaaaagaggg agaaagaacc tgtgaaacat ttgnttgtnt gtgaggaaga 840
aagatagttg ctatttggga agaaacg 867

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<210> 124

<211> 694

<212> DNA

<213> Homo sapiens

<400> 124

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ctgcactcca gcctgggcaa caagagcgaa actccatctc aaaaaaacta ccaggaatga 60
atgttttagct aaaaaattcc ttccatttca aagtagaata tgggagattg gttaagcagt 120
tactcagata aagaggattg tgatttcaga agatggcaca gtttgagtca aaaatgagaa 180
attccccctgg ccaaaatgtg gtaatgagat ttccaggttat attaatagaa gtatggtatc 240
ttcactgtgg aggtgctggt cctctctggg gcatcaatca tcccatagct agagtattgt 300
gtttgggttt tagtaacatt acaaatatgg gtgggggttat catctgtcca aatcagttct 360
ctgggtgtcag ttattttaatg gtttcccatc atacttaaaa atcatatcca ggctggggcg 420
agtggctcac gcctgttatc tcagtgtttt gagaggccga ggcgggtgga tcacgagatc 480
aggagatcga gaccatctcg gctaacaggg tgaagccccg tctctactaa aaatacaaaa 540
aaaattagcc gggtaggtg gcgggcacct gtagtcccag cgactcggga ggctgaggca 600
ggagaatggt gtgaatccgg gaggcggagc ttgcagttag tggagatcgc gccactgcac 660
tccagcctgg gtgacagagc gagactccat ctct 694

```

<210> 125

<211> 787

<212> DNA

<213> Homo sapiens

<400> 125

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agtgatectc ccacctcggc ctcccaaagt gctggattat gaatgtgagt caccttgcct 60
ggccaatttc aggagttttt cactactgtac agactacgga gatcctgcac tgaatcagg 120
aactgtaca ggcttatggg atgagatctg atgtccta atgtggcattta aggtgatata 180
gtccagctgg ctccaggcta cctcctcagg gtttatccta atccccacta accaaatggt 240
ttgctaatac ttccatacat actctttctc tgcacaaatc ctctcatggc tgaatccagt 300
gacctatggc ctgtggagat gaccttttgc ttccagtttt cccttgctca tagtccagct 360
ccatttctac ctaccttctt tataaaacgt ccccaaaaaca tttctgctcc tggggatata 420
tttcataccc tttgaactgc agttacatta ttgctctgaa acaaacatca aaatagtatt 480
tgctctttta agaataattt tttaggccgg cacagtgggt cgcgcctgta atcccagcac 540
tttgggaggc cacagcgggt ggatcacctg aggtcaggag ttcgagacca gcctggccaa 600
catggtgaaa ctctgtctct actaaaaata caaaaaatta gtcaggcgtg gtggcgggtg 660
ctttagtacc cagcnaactg gaagattgaa gcagtagagt cgcttgagcc tgggaaggcg 720
aggttgcggg gagctgagat tgcgccactg nactctagcc tgggcagcaa gagtgaact 780
ctgtctc 787

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<210> 126

<211> 880

<212> DNA

<213> Homo sapiens

<400> 126

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cgcagaatga attatttttt ggttacccaa aggcaatcta aaaattactt ggagctgagc 60
agggcgcgca gttcagagcc ccagcaggcc gccctgctgg tcagcgggac acacagggtt 120
agcgcgcggg ggtgtgggca gccctgtgg ctcgagagcc tgtcacttaa ctggtggatc 180
cgttatttcc cagaatggtt aaattccctt cggggagagc ttgggtgaaa caagaggccc 240

```

```

aaaatatgta actcttgatg gangggatcc tectggaatc agcattttcag gctgttctgt 300
ttccccgcaa ctccctgtgac ttctcgaagg cgggtgcccag cctggccctc cctcgcgggg 360
gccaggagc cactccctgc ctgtgcctct taccacgagc cgggtgctgt ccctccagct 420
cctcctgagc gaggccgtgc actaacagac tcgatctccc ttacgcctg taatcgctct 480
tagagactga cttgtgccac agctgcgga gacagcgtg ctgcagggct tggctgaggt 540
ggcgcgagc ggactgcacg cgcgtcctg gggggcgtgg ttgggacgg cttctgggag 600
ccctccagc agcgtgtct ctgccggcat gtgagtgaag gtgcttctct taccgtgtgc 660
ccctcgaggt aaacctgtaa ctggaatgtg tgtggagtgt gactgataga aactacctg 720
attcttatgt atttactgac ctgtgtttt ttgtacttt tttcttttc tcccttccc 780
ctttccctat ttttttctt gccctgatcc ggaatttct tgccaactga ctgcacggta 840
ctnctgcttc ctgttgttgc ttgaaacaaa aaaaaaacat 880

```

<210> 127

<211> 460

<212> DNA

<213> Homo sapiens

<400> 127

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gtttttgaac agcattttatc aagaagaaaa tgtgggcttt ttccctctc cctgtttttg 60
tttgtctgt agatagagg aggaaagccg tgcagtggca ggcgggaccc cctctggtg 120
cgggaccccc tcttgcggtg gtcttgcggg gccagccggg acctgtcact ttattattta 180
aggagtgtgt gtgtagagtc gctggcttat taacagtatt gtgtgtgggt tgggttttta 240
gtttgttctt tctttttgaa gtcccttcat ttcaatcctt gactctctct ccccttccc 300
tgcccgctc tgttgaatgc tgctgtgcgc gtgtgagggc cgtctgtcac acagggccct 360
tgggttgtgt gaactgaaat tctccctgta tttgtgagac tcgcaggagt ccccatctgt 420
agcacaggca atgccagtgc catgctgcag cctcaggaaa 460

```

<210> 128

<211> 495

<212> DNA

<213> Homo sapiens

<400> 128

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caactctaaa ttttaagtta ttatatcaaa ttctgggctg gacaggtaag gtgtttgcca 60
tacatgattg caattgtgag gtttctttgt gtataaagtc tttaaattta tatggtaggt 120
caaaaaacat attagctgat aataatactt actttcaaat atcacttaaa atttctcttc 180
aaaagcattt ttttaaatct ctttttaaca ccttgacca atgaagtaaa ataaacaaga 240
tgatactccc gttaaatgtg tgtacaatca ttcagctgct gtggcagaat atacaacagt 300
tctcagccct gtgtggctct ttctcaattt gtcactcaat tgattgtact catacatgtg 360
ttagaccaac atctcaata ccgtttgttg gttagcatca tctggggaga ctgtaaaagc 420
ataagaatat tcagctacca acccaggggg ttctttaaat tagtgggact ggggtggtgt 480
ccaggcatca gttgt 495

```

<210> 129

<211> 557

<212> DNA

<213> Homo sapiens

<400> 129

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cggagtgtga gccccggagg cagagcggct gccatggcca agtacctggc ccagatcatt 60
gtgatgggag tgacagtggt gggcagggcc ttgtcacggg ccttgccgca ggagtgtgca 120
ggggtgagcc accaactcgg aaggcccagg gtgaagtgtg ggctgctgag gactgagcga 180
tcacccacat gtccacacag ccagccgggc cgcagctgat gcccgaggac gcgctggaca 240
ccggtctgca gccgcttcca acctctcgg cctcagcctc caggaggcac agcagattct 300
caacgtgtcc aagctgagcc ctgaggaggt ccagaagaac tatgaacact tttttaaggt 360
gaatgataaa tccgtgggtg gctccttcta cctgcagtca aagtggttcc gcgcaaagg 420
gcgctggat gaggaactca aaatccaggc ccaggaggac agagaaaaag ggcagatgcc 480
ccatacgtga ctgctcggct ccccccggcc accccgccc ctctaattta tagcttggtg 540
ataaatttct tttctgc 557

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<210> 130

<211> 600

<212> DNA

<213> Homo sapiens

<400> 130

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cttgggtttcc agaatttcta gagtgggtgg gcatgattcc agtcaatggg ggaccgcccg 60
tgtctaagca tgtgcaaagg agaggaggga gatgaggtca ttgtttgtca ttgagtcttc 120
tctcagaatc agcgagccca gttgtagggt ggggggcagg ctcccccatg gcagggtcct 180
tggggtagcc cttttcctct cagcccctcc ctgtgtgagg cctctccacc tctcaccac 240
tctctcctaa tcccctactt aagtagggct tgcccactt cagaggtttt ggggttcagg 300
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gctgtgggaa ggggttttct tctttttctt ggaacctgcc cctgttcttc acactgcccc 420
ccatgcctca gcctcatata gatgtgccat catggggggc atgggtggag cagaggggct 480
ccctcaccac gggcaggcaa aggcagtgagg tagaggaggc actgcccccc tttcctgccc 540
cctcctcatc ttttaataaag acctggcttc tcatctttaa taaagacctg tttgtaacag 600

```

<210> 131

<211> 455

<212> DNA

<213> Homo sapiens

<400> 131

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ggccggggccc aggcaggtgg aagccatggc tctggccggg tcacaggggc gctgggggtt 60
gacctggcgg ccatgatggg ctctggaccc aggagccacc cgggcacagg atgggacggg 120
ttgagagatt ggtcgtccag gcgttgagtg tgccctcgct cctccccacc ttccgcccgt 180
gccttgagcc ccttgccccc gcgcccattg ggttaaatct ctccctgtct ctctctgtct 240
caagttgttt tccaagttag gcagagaatg gttctcttgt tacciaacatg gcttctgggc 300
attgggtaat gcgtccctc ttctcccgca gcgccacaaa gggacctttt gtccccctcc 360
ctgcccctct cgctggctct tcccgccccc ccaccaccc aaactccctc ctccccccgc 420
cggcgcccgcc accccggggc tgcgcgctga ccgtg 455

```

<210> 132

<211> 691

<212> DNA

<213> Homo sapiens

<400> 132

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gcagaagcag cagcagcagc agcagccctc gccgttcgag gagcgcagcc gagccggcca 60
tgccgttgct gatgccgtg aatgggctga agggaggaga caaagagccc ctcatcgagc 120
tcttcgtcaa ggctggcagt gatggtgaaa gcataggaaa ctgccccctt tcccagaggc 180
tcttcattat tctttggctc aaaggagttg tatttagtgt gacgactgtt gacctgaaaa 240
ggaaagccagc agacctgcag aacttggtc ccgggaccca cccaccattt ataactttca 300
acagtgaagt caaaacggat gtaataaga ttgaggaatt tcttgaagaa gtcttatgcc 360
ctcccaagta cttaaagctt tcaccaaacc acccagaatc aaatactgct ggaatggaca 420
tctttgccaa attctctgca tatatcaaga attcaaggcc agaggctaat gaagcactgg 480
agaggggtct cctgaaaacc ctgcagaaac tggatgaata tctgaattct cctctccctg 540
atgaaattga tgaaaatagt atagaggaca taaagttttc tacacgtaaa tttctggagt 600
gcaatganat gacattagct gattgcaacc tgctgcccac actgcatatt gtcaagggtg 660
tggccaaaaa atatcgcaac tttgatattc c 691

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<210> 133

<211> 497

<212> DNA

<213> Homo sapiens

<400> 133

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gcaggtgcgc caagtccagc cccacgacgc agtgccgact ccccgccgtg cccccagccc 60
ggcccggggt gcggagcctg ctctgggcc tctgcctgct gcgtccacc tgggggaagc 120
gcccgtcgta cctccacac cgggggcttc ccctgacccc ttaggccctc cccctgcagg 180
tgccctcgcg cccctcccg ggtccccagg tgagtagggg ctgaatatga caggagaggc 240
cgccggacgg gcgtggccgg gagggaaatg gggctggatt ctagagcgtc ggacctggcc 300
gccagaactg gccgtctccg tcccgggcac tccgaccgtg ggaccggagc cctgagtggc 360
ggagagctgg cggagctgcc cccaaaggag cactgagtc cggaagtgg tttttgtgg 420
agggggctgt ggggctcgct ccacctgccc cttcttttc agcacttgca tggcgcttcc 480
ctctattttc actcttg 497

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<210> 134

<211> 834
 <212> DNA
 <213> Homo sapiens

<400> 134
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 gaagcttgcc tgagctgttt ggacaaaaat ccaaacccca cttggctact ctggcctggc 120
 tttagcttgg aacccaatac cttagcttac aggcatacct gagccagggg cctctggaaa 180
 ttctcttctc gatgttcctt taggtttggg cacaaaatat aattgcctct cccctctccc 240
 attttctctc ttgggagcaa tggtcacagt ccctgggtacc tgaaaaggta cctaggtcta 300
 ggcccttctt ccctttccct tctctcccc taccacagaa ctttggctcc ctttcccttc 360
 tctctctggt agctccagga ggctgtgat ccagctccct gcctagcatc catgacctgt 420
 tggatgttac ctccaatcag ttctctgtcc tacctgcctc tttggcttgg acctatatgg 480
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 aagtgggggc agggcacaca ttcatctttg taggaagggtc tggcctgggg tcgggtgaag 660
 gagggccag gtcagttctg ggggtccagt gacctgttt gccattctcc tgggtccgct 720
 gctgctccct gtttctggag ctggatgttc ccagctggc agttgagctg cctgagccaa 780
 tgtgtctgtc tttggttaact gagtgaacca taataaaggg gaacatttgg cccc 834

<210> 135
 <211> 814
 <212> DNA
 <213> Homo sapiens

<400> 135
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 gaactggagt ccttgggtccc caatgcactg gattacatcc gcacgggtcaa ggagctgggc 180
 aacagcctgg acaagtgcaa gaacaatgag aacctgcagc agatcctcac caatgccacc 240
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 ctggagcggc tggaggaggc ctgagacatg gcgctgcagc tgaacgcctc caagcaccgc 360
 atctacgagt atgtggagtc ccggatgtcc ttcatcgac ccaacctgtc catcattatc 420
 ggggcatcca cggccgccaa gatcatgggt gtggcggcg gcctgaccaa cctctccaa 480
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 ccaccggatc tgcggcggaa agcggcccg ctggtggccg ccaagtgcac actggcagcc 660
 cgtgtggaca gtttccacga gagcacagaa ggggaagggtg gctacgaact gaaggatgag 720
 atcgagcgca aattcgacaa gtggcaggag ccgcccgtg tgaagcaggt gaagccgctg 780
 cctgcgcccc tggatggaca gcggaagaag cgag 814

<210> 136
 <211> 457
 <212> DNA
 <213> Homo sapiens

<400> 136
 gteccgggag ctcccgtcg ggcctgcgga cgccatggag cttgctgacc acctgggtgaa 60
 gcgggcggtc gccgtgcagg cggatgatgt ggaggtgctg aagggtggga ggaccagct 120
 gatcgacgcc gttctgaatc tgtgcaccta ccatcacctc gaaaacatcc agctcccacc 180
 ggggtaccag cctccgaacc tcgccatctc taccctctac tggaaggcct ggcccctcct 240
 gctggtcgtc gccgcattca acccagagaa catcgccctg gctgctgagg aggagtaccc 300
 gacctgaag atgctcatgg agatggtgat gaccaacaac tactcctacc caccgtgcac 360
 cctgacggat gaggagacc ggacgggat gctgaaccgt gagctgcaga ccgcccagcg 420
 ggagaagcag gagatcctgg ccttcgaggg gcacctg 457

<210> 137
 <211> 813
 <212> DNA
 <213> Homo sapiens

<400> 137
 ggaaggatga ggctgcgttt gcagcgcgtg aatgagacgc ggatatcaaa gcagactgca 60
 atacctgct ggaaatagaa gacagaaagg tgagtcaata ttttcatctt ttaggggtgc 120

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aaacaaaaca agaactctgt gaattgaacc caggtgttta aggcattgccc ctctcgatga 180
tgggtttgtag gtgattcacg gtctatgaca tatttaaaga caatcagact taaaaatgct 240
tgtcattttta ctccctttaca atctgtgtta cttctgatgg cttcatgagg agtgcatatt 300
gtaattttttt acaaaaaatg tgggtgctgat ttgtttcagt catacccttc ttttcaggaa 360
aatacttttaa cacttgctcac attgaacttg aatattgatg ttgacgttca ttgtgtgtat 420
catatgtata attattaatt atattattac ttacattata gaatatataa tattaggctt 480
cccagggtgt gtccctatat atctgactca tacacttgaa aaagagctca cggccagggtg 540
tgggtggctca tgcctataat cccaacactt tgggaggcag ggggtgggtg atcatctgag 600
gtcaggagtt agagaccaac ctggccaaca tggggaaacc ccgtatctac taaaaataga 660
aaaattggcc ggggtgtggtg gcacgcgcct gtggtcccag ctgcttggga ggctgaggca 720
ggagagtgcg ttggtccttg gaggtggaga ctgcagttag ccaaaattgc accagcgcac 780
tccggcctga gtgacagggg gggcctccgt ttc 813

```

<210> 138

<211> 687

<212> DNA

<213> Homo sapiens

<400> 138

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ctttctggtc ttagtctccc catctgaaaa tggcataacc aacctacctg cctcaaatac 60
aagaccctgc ttgtgaagcc ggactcctct gcaccaccct cgcaccgac gccggtgcgc 120
tagtctccgc tcgctcgat gcacttctg cgcctccgac ccgcgcagac ccgcggcggg 180
cgcccgccgc ggttctgccc acgcacactt gatgctctgc gccttttggg cagcgcgccac 240
gcaacgacta cgcaccgaa ccttgctcc ggcacccttg gccacactcg ccacacttac 300
acgcgcgcac ttctccagag gacgcacgat gggaaagaga gagttgggac ccgcaggagg 360
gggcagggca ctgaccgggt gccgcccagc agggcagcgt ctctggctc agaccagtgc 420
tagaagtgtc cagtctagca gctcctggac caagactccg tggccattcc cttcctcctg 480
ccttccatcc acccctttac gatacagaag ttgagataca gagaggtgaa ggaacttgtc 540
ccaggcccta cagctagtaa gtgatggacc tggaaattta gccaggtag actgcctcta 600
gagactgtgc ttacaacct tttatcctgt gcctgttccc cttttatcct gttgtagttt 660
tcactctcta agaactatct cattggg 687

```

<210> 139

<211> 727

<212> DNA

<213> Homo sapiens

<400> 139

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ggcagtttgc tgggactgct gagactgggg ctgaggatac gcagcctgct gggagagcgt 60
cgagggtgct ggtgctgtag gttgctgctg ctggttaagga gactgagcct gtggctgtga 120
gtaggggggc ttgctctggg ggtgctgctg tgcgtcgac tgctgggagg ggtatggagc 180
cggggactgc tgatgtggag gctgggatgg ctgctgggag tatggaggct gagaggactg 240
gagctgtggt ggttgagact ttggctgctg ctgatacgaa ggttgggcat gaggggtctg 300
ggacggtggt tgctgggagt aggggtgctg ctgctgctga gggtagggac tttgctgggt 360
gtaatatgga gtctggccct gttgaccata cccgctgggg ccttgttgtc cataaggagg 420
aatctgctgt gtataagaga ggccgcccat ggactctgc gcccgccct gcattggtcat 480
cgggtaccgc tgcggggtct gggaccgta tggctgcctt gggtagccat gtccctgctg 540
cggctcctgac ggaggtccct gttgctgcga gtatgggtta gtcccgccat atggctgagg 600
tctcatcttg cccatctgat ccattggact ggatggctga ggggtccggg cgagcggctg 660
ccccccgccc ccgctgctcc cggggctcat gggcgcgtgg tggctccttt gttgggcccc 720
tcccagag 727

```

<210> 140

<211> 812

<212> DNA

<213> Homo sapiens

<400> 140

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gcttaatcta tttcatgaag ccacatgcag atgtctgcac ccccccattg ctgcaggctt 60
tgctttcagc cttctttcaa ggaaagcctg gggctttctg gtttctcatt tatatttgtg 120
tctgcagggt gcaacaccgg aggatttcag caacctccca cctgaacaaa gaaggaaaaa 180
gctgcagcag aaagtcgatg agttaataa agaaattcag aaggagatgg atcaaagaga 240
tgccataaca aaaatgaaag atgtctacct aaagaatcct cagatgggag acccagccag 300
tttggtacac aaattagcag aagtcagcca aaatatagag aaactgcgag tagagacca 360

```

```

gaaatttgag gcctggctgg ctgaggttga aggccggctc ccagcacgca acgagcaggc 420
gcgcgggcag agcggactgt acgacagcca gaaccacccc acagtcaaca actgcgcccc 480
ggaccgtgag agcccagatg gcagttacac agaggagcag agtcaggaga gtgagatgaa 540
ggtgctggcc acggattttg acgacgagtt tgatgatgag gagccctcc ctgccatagg 600
gacgtgcaaa gctctctaca catttgaagg tcagaatgaa ggaacgattt ccgtagtgtg 660
aggagaaaca ttgtatgtca tagaggaaga caaaggcgat ggctggaccc gcattcggag 720
aaatgaagat gaagaggggt atgtccccc ttcatatgtc gaagtctgtt tggacaaaaa 780
tgccaaaggt gctaagactt atatttaata cc 812

```

<210> 141

<211> 621

<212> DNA

<213> Homo sapiens

<400> 141

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gtggttgtga ttgctccttg gtagccctga gaacttaaaa aatggattgt agtattaaag 60
tcaaacagat tttgcctttc taccgagatc catattaaca gtttggaact tctaatacata 120
aatatcagac ctgtatcaga cttgcaatag caaggaaaaa gaaactatcc tacatctcaa 180
attccaacaa gttttaaata taacaggaga gcagaattgt acaaactttc atatggagcc 240
attgatttta gctcaacttg atgttctacc atattagagt gcatgtttca actttctgct 300
ataaagagaa aacaggaaaag ggagataaga aaggaaaactc cagctgggca cgggtggctca 360
cgcttgtgat ccagcactt tgggagggcg aggcgggcag gtcacgaggt caggagtctg 420
agaccagcct gaccaacatg gtgaaacccc gtctctacta aaaatgcaaa aattagctgg 480
gcttggtggt gcatgcctgt ggtctcagct actcgggagg ctgaggcagg agaatcgct 540
ggactcggga gtgagagatt gcagtgcac gagatcatgc cgctgcactc caacctgggt 600
gtcagagcga gactctgtct c 621

```

<210> 142

<211> 572

<212> DNA

<213> Homo sapiens

<400> 142

```

caggaacttg tcacacagac ggagccaggt gtaatgccag cccaggggcc aagcagcagc 60
tttgcaaatg ttgcagcagc cacaccacag taagaaattc ttttctgctg catccaggtg 120
gtccaacca gcaccgtcct ttccgtgtgg ggtgtgcctg acccctcctt ttccccctcc 180
cagaaagggt aagaagccgg ccctgacctc ccaagtccat tccatggctt gctgatgggc 240
tgggtcacag ctctaaccct ctcaacctgg cctgtcctgg agcaggcggc tttggtgagc 300
acagctgctg aagggggcgg aaatgccgga cgtgcctgtc ctgctcactg gggtcgtgtc 360
tttgcccagc ctggcccagg cactgggcgg ggagaatggg gccttgtgtc tccagctcac 420
agccgagctt tcagagcatg agactgggtt cattgttcag aaccgggaaa actaaaaaca 480
gcattgagag tggaacttgg gccttctgga aatgacagct gagtaaagac tcattttattc 540
tgctttcctt cttgaaactc actgcagtga ac 572

```

<210> 143

<211> 709

<212> DNA

<213> Homo sapiens

<400> 143

```

gcatcagcga tggcggtgc gtcggggtcg gttctgcagc gctgtatcgt gtcgccggca 60
gggaggcata gcgcctctct gatcttctct catggctcag gtgattctgg acaaggatta 120
agaatgtgga tcaagcaggt tttaaataca gatttaacat tccaacacat aaaaattatt 180
tatccaacag ctctcccag atcatatact cctatgaaag gaggaatctc caatgtatgg 240
tttgacagat taaaataaac caatgactgc ccagaacacc ttgaatcaat tgatgtcatg 300
tgtcaagtgc ttactgattt gattgatgaa gaagtaaaaa gtggcatcaa gaagaacagg 360
atattaatag gaggattctc tatgggagga tgcatttagc atatagaaat 420
catcaagatg tggcaggagt atttgcctt tctagtttct tgaataaagc atctgctgtt 480
taccaggctc ttcagaagag taatgggtga ctctctgaat tatttcagtg tcatgggtact 540
gcagatgagt tagttcttca ttcttgggca gaagagacaa actcaatgtt aaaatctcta 600
ggagtgaaca cgaagtttca tagttttcca aatgtttacc atgagctaag caaaactgag 660
ttagacatat tgaagttatg gattcttaca aagctgccag gagaaatgg 709

```

<210> 144

<211> 851
 <212> DNA
 <213> Homo sapiens

<400> 144
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 tagtcatgtg ggtccagatg gcctcagtc tagatgttgg caccctttgc tgtgtctcct 120
 cagagtatcc tgttccgcct cctgccacct ggacctccct cagtggatgt cttccctccc 180
 ccgaccccag cctgtcagtc cgagcacagt gcaggtttgg ctctgacttg ggcttttggc 240
 tgcagtgggg gtggatttca gagcctctca tggcagcatc taagtgacca gagctgggat 300
 gagagagggg aaggggcaat gtgagtggcg ctatgggacg ggccagccct gctcctgagc 360
 cagccccgcc ctctgcccc tggccctggg ctctgtgcta gggatggatga agaattgggg 420
 cgtgccagcc tggcaggagt gggaagcaac acgcaggggt cccggacctc tccagccttg 480
 ccctcacgct taccgagct cccagtgtgg ttagcacaga gctcaccac cttgcctggc 540
 tcccagctgg ggctgtcct cactgggtct ccagggaag aaacgacagc ctacttctg 600
 tatggactgc tgatgtggcc tgccatctg ttcagcgggc attgtctttg gagcagcagg 660
 agaataggat gcctctcact cacatgccag ttctggctg gccagctgct cagggetcag 720
 gctggggcct cccattgaca tctccccc acactccctc tctgagcctc cgtcgccct 780
 cctgttgggt aagggtgttg agtgtgactt gtgctgaaa cctggttcat atataataaa 840
 taatggtgac g 851

<210> 145
 <211> 422
 <212> DNA
 <213> Homo sapiens

<400> 145
 gttcgtgggt ggcgctggag ccgagccgga ctggtcagga tgatcacgga cgtgcagctc 60
 gccatcttcg ccaacatgct gggcggtcgt ctcttcttgc ttgtcgttct ctatcactac 120
 gtggccgtca acaatcccaa gaagcaggaa tgaaagtggc gctttctccg cccaggggtt 180
 ccaggacata gtctgaggca agatggaggg tatgaggggc cttcacactt cacttcatcc 240
 cttctaccca tcacaacata caaagcaact acacctggat ttttccaaac aacttttatt 300
 tctcagagt cttccttaat cctatggaac aagaagctgc cactgaatag ggcccagtat 360
 aggggcttgc ttttctactc cctccccca atataaaaat atagactttt ttttgtggtc 420
 cc 422

<210> 146
 <211> 555
 <212> DNA
 <213> Homo sapiens

<400> 146
 ccgatgcccc gggatctggg acggccatgg gcttcacctg cacaggcacc cctggcccaa 60
 tctcagagc tgccactccc acactgctcc cgatggaaat tccagagctt tacagaatcc 120
 cctgttttat gaaaaggggt agacgtggca gctcaccaca ggtcgacag cctcatggcc 180
 agccgggggt tgaacctggt accacctgct tccccacac ccaggggctt tccagggggt 240
 gcctggaggg ggaggggaagc cgatgttttg tgggtgagcc tccctgagtc catccgtttt 300
 ttgtttgttt gtttacttgc ttgtttgttt ttgagacagt ttcacagttt cattcttgtt 360
 gcctgggctg gagtgcaatg gcgtgatctc ggccactgc aacctctgcc gctgggttc 420
 aagcgattct cctgcctcag cctcccaagt agctgggatt acaggcgtga gccctgcac 480
 ccgactatcc atctgttttt tgtgtttgtg atggagtctt gctccgcgcg gggcgggcgg 540
 gggggactct ttctc 555

<210> 147
 <211> 513
 <212> DNA
 <213> Homo sapiens

<400> 147
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 cgattgggga caatggcgct tcttggccac atcttggttt tctgtgtggg tctcctcacc 120
 atggccaagg cagaaagtcc aaaggaacac gacctgttca cttacgacta ccagtccctg 180
 cagatcggag gcctcgtcat cgccgggac ctcttcatcc tgggcacact catcgtgctg 240
 agcagaagat gccggtgcaa gttcaaccag cagcagagga ctggggaacc cgatgaagag 300

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gaggggaactt tccgcagctc catccgcgct ctgtccaccc gcaggcggtg gaaacacctg 360
gagcgatgga atccggccag gactcccctg gcacctgaca tctcccacgc tccacctgcg 420
cgccccaccgc cccctccgcc gccccttccc cagccctgcc cccgcagact ccccttgccg 480
ccaagacttc caataaaacg tgcgttcctc tcg 513

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<210> 148

<211> 801

<212> DNA

<213> Homo sapiens

<400> 148

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ggaagagaag gaaaaaagag aaggcgctgt cccgctcttg ctacggtggc ctggaggagt 60
ggcgaaaccg gaacagagaa tttatcactt ctgggactca cagtcgtgat gtctttcaag 120
agggaaggag acgattggag tcaactcaat gtgctcaaaa aaagaagagt cggggacctc 180
ctagccagtt acattccaga ggatgaggcg ctgatgcttc gggatggacg ctttgcttgt 240
gccatctgcc cccatcgacc ggtactggac accctggcca tgctgactgc ccaccgtgca 300
ggcaagaaac atctgtccag cttgcagctt ttctatggca agaagcagcc gggaaaggaa 360
agaaagcaga atccaaaaca tcagaatgaa ttgagaaggg aagaaaccaa agctgaggct 420
cctctgctaa ctcagacacg acttatcacc cagagtgtct tgcacagagc tccccactat 480
aacagttgct gccgcgggaa gtacagaggt caaactccaa agtgggaaga tcagtaggga 540
acctgaacct gcggctggcc cacaggccga ggagtcagca actgtctcag cccctgcacc 600
catgagcccc acaagaagac gagccctgga ccattatctc acccttcgaa gctctggatg 660
gatcccagat ggacgaggtc gatgggtaaa agatgaaaat gttgagtttg actctgatga 720
ggaggaacca cctgatctcc ccttggaactg ataccctttt cccattcatt cacaataaaa 780
ttacaatggg tgctgagaac t 801

```

<210> 149

<211> 503

<212> DNA

<213> Homo sapiens

<400> 149

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ggccttcgtc ttccgaatga actacagccg caagaaccag gactcggaag ttgatgggtg 60
catcaccctt gagaagggaa tctccaaaga agagctgggt gccgtcctgg agctctaccg 120
ggaggcacgg ggggcctcct cggatgtcac caggctgctg gagacctct cccagatgga 180
gagataccag caacattcca tgggtgttct gggacggcga tcaaggacca agagcgacct 240
gagcctgaag atgtaccagg aggagatcca ggagtgggtat gaggagcatg ccagggagca 300
agagcagcag cgacaactca gcagcagtgc agccccgcc gccagcagc cccaggcag 360
ccgccagcgc tcccagaccg ttacctagcc cagcgcccga aagccgtctc ttctatgcaa 420
taacacaata gtattactct actgcgatgt acggaactgc ggtgtgtgta cacatactca 480
cgtatatgca catatttata tac 503

```

<210> 150

<211> 485

<212> DNA

<213> Homo sapiens

<400> 150

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ggcggcccga gctgggtccc gtgttgaccg ggggcacccc cgagccaccc ggcattgctg 60
gccctgcagc gccccaaccc ttctctggcc acaccaccaa gtgtgaggcc gactccagcg 120
tcccaccccc agggctcccc ctgcagccc cagatgaccc tgtcattcct ggcagtggct 180
ggggcacctg tgttgcgacg aggagttccc agaccctga ggctgtctgt ggctgcaga 240
gccccagggg cgcgaggtc tgacctgcag cgctgaggt ctgactgtct ctgctgcag 300
catgccggcc cctctcctgc agccctgcc cctcacctgc ctgggacctg ccccgctcc 360
gcatgcatgt ggatagaccc ccacgggcgg tggccaacgc ttgtccctgg ggccacacag 420
gggacactgg aggtcacagt tattttattga tcacaaattg tggacattta aaacagaaac 480
tgttc 485

```

<210> 151

<211> 723

<212> DNA

<213> Homo sapiens

<400> 151

```

gggtcctcgg gcatgaacgc gagcccaaaag tgccagtcgt cgattggaaa tttccagcca 60
ctttaagcca gtgctgagta gggcttctgc agagccatgt ttgagccaag gtcttggaag 120
gcattgcccc atgggctcag gtgactcggg gtggagttag cagctctgca gggccctctc 180
atacacgctt gaggcagaag cagcgtcccc cgtgaaagcc accttccgaa gctcctgcgt 240
tttttgcaaa cttggcttcc ccaggggca ggctggactt tcctgcccc cctatgattg 300
aagtccctct gcttttgggg gctgccttcc cagagtcccc cgggtgctcc cctgccgagg 360
tcaggagctg accaagcctt ggcccgggtga cacctgcagc cctcactcct gtcattcccag 420
gacacttgag gcccaaggag gtggagtggg gagtgggctc gggtagatgg gagccagaag 480
ccagatggac ttggtcaagt gtcggctact tggagcctcc agtgtgcgtc aggggtctgtg 540
ggcaggggac agggcgtggg tggggggcga ggctggcagc cccctctgcc ctcaccgtct 600
tggtgncctg gcctcgcgcc cctcccccaa gtctcttctg tgcaaggccc gcctcggcct 660
cggcngctgg ttctgtcct gttttntgtg tctgaaagtt ttcaggttgt ggtgcatcag 720
ccc 723

```

<210> 152

<211> 697

<212> DNA

<213> Homo sapiens

<400> 152

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tttttttttt tttttgagac ggagtttcac tcttgcccag gctggagtgc agtggcacia 60
tctcgcccca ctgcaacctc cgcccccccg gttcaagcga ttctcctgcc tcagcctccc 120
aagcagctgg gaccacaggc gcccgccacc acgcccagcc aatcctttat atcttttagta 180
gagacagggt ttactgtgt tagccaggct ggtctcgatc tcctgacctc atgatctgcc 240
cgctcgggcc tcccaaagtg ctgggaccac aagcttgagc caccgcaccc ggccaagacc 300
ctgtctttac aaaaataaaa aaaattacaa aattatccag gaatggttgc aaatgcctgt 360
agtgtcagcc actcgaccac ttctaacgca gggattcagg aattgggctt tcagactcct 420
tctgcagtgt cacagtccag acttttttta aatgaaggac accccgcagt ggctcacagt 480
gggtcccagg gctagcagga gcgtgctggg gagccggtc tgtctttgtt cgcagtgggt 540
cccggtgctg gcaggagtgt gctggtgagc cggtctgtc tttgtaaate cttcaggggt 600
cctacggctg actccaccgg acagcccgct ctgggcccgtg ttaagcacct tttgtagaaa 660
tcgtattttt attaaaacat caaatctgtg ttctgtt 697

```

<210> 153

<211> 456

<212> DNA

<213> Homo sapiens

<400> 153

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ggctcttctt atcattgtga agcagaatc accaagcgtt ggattgttca cccactaata 60
gggaacgtga gctgggttta gaccgtcgtg agacagggtta gttttaccct actgatgatt 120
gtgttggttc catggtaatc ctgctcagta cgagaggaaac cgcagggtta gacatttgg 180
gtatgtgctt ggctgaggag ccaatggggc gaagctacca tctgtgggat tatgactgaa 240
cgctctaaag tcagaatccc gccagggcgg aacgatacgg cagcgccgag gaggctcgt 300
tggtctcgga tagccggtcc cccgcctgtc cccgcggcgg ggccgcccc cctccacgc 360
gcgcgcgcgc gggagggcgc gtgccccgcc gcgcgcgggg accggggtcc ggtgcggagt 420
gcccttcgtc ctgggaaacg gggcgcgcc ggaaag 456

```

<210> 154

<211> 377

<212> DNA

<213> Homo sapiens

<400> 154

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tgactgcaga gcggtagagg tgtatatatt tcatactgtg gggcaaagta tttgtgctgc 60
tttttgaga tggactggaa cgtctggttt ctgtccccgg gccggcagct acgtctattt 120
tctgtagaag gtgccacagt gagacctgga gccacccctt cctgccctgg cgcggttag 180
agctgggagc ccgtggactc ccggcctgtt tctaccttct attcaaccac tctgacgtgg 240
ggagacaaga agaaatagaa ctttttgata gtgtggtaaa aacattgatt tgaactattt 300
tagtaaaagg agtaacaaac aagattgtga tagtgtctac tttgagctag ataaataaag 360
gcctctttgt gaggctc 377

```

<210> 155

<211> 609

<212> DNA
<213> Homo sapiens

<400> 155
gtttagnat ttcctttatg cgattttgaa cctcatccat tttataagt taagaggcag 60
gaggettgc attgggtttt tcaacagtct gatttaaatt atcactcatt tccttagtag 120
aggttcttga gagatgcac tgcaaagggt gttgaaggga cgcctttggg cttaacctgt 180
tgttggtgga catggtcaca tgcctttgca ctggaatgct tttgaatgct tcatttccaa 240
gagttgtgtg tagcatataa ggagacattt cagcatcagg cttaactcca acagagtttc 300
ctttgtctct taacgggtgct ggattaggtt tttttgcca cagaaaaatt tgaagcaaat 360
cctggtgtgc tgagggttgc ttttggtttt ccttctagaa aaaatggcat ggttttcttc 420
actctcatct gacaattaac ttgacgccc gtttctcctt tagaactcct ttgacgagcc 480
acaagctgag caanttcttg cagtttctgt gcaggccatg gcatagcagg taatctcgtt 540
ccggggccca cggcccgctc ccgctctctt gggcccgct cctgcccgcg tctccgccag 600
ggcccccgc 609

<210> 156
<211> 587
<212> DNA
<213> Homo sapiens

<400> 156
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cttcatgcag tattcagacc agagataagg ggggggatgg ctacacaggtc cacagggacg 120
tcacanggca caggcgggac acggcgacgt ggccggggct gggcggggag ggggacccca 180
cgcacgttaa ccgccagcag gggaggggct gnaacgagc agcctcggac caaggacagc 240
ctcccggna cgcacgggac nggagcaaca tcgggtgaac tgcaatgacc tcgcttgtct 300
ttcgggggaa cccaggatcc cctgggaagc ttctctgnac tggcctcacc ctttcggggc 360
tggctggctc acgtcatcac tgcgggatcc aagacacatt ttagggccaa gtcggttag 420
cgggtcgggg cgtgtggggc ncgcggtggt cttgacttct gctttcccc accatccct 480
tgccctgggt ggactttctg agaggggtgt gnacggcctg ctggagtccc gcgcgagccc 540
ctcccaaagg aacttcgagc ccggccccc ctactcgggc gtctact 587

<210> 157
<211> 651
<212> DNA
<213> Homo sapiens

<400> 157
attatcatc acatacacia aaagaagtgt tcacctcct gacgcagggc ttgtcgtgag 60
cctggggcgc ggcggtggt ctgggcaagc tctgcctgtg ccgtcgccgc ctgctggagc 120
gcccacgggg ctgggatgcc agcccgggccc ctcggtgtt ggctgtggcg ggcgcgtg 180
ggctgctggc tagcggcttg cagctggcgg ctgcgctctg gctgtacccg ggcccaggcc 240
gcgtggggcg cttctcgtgg gcctgggtgg gtgtccactt ctggctgcgc ctctggagc 300
tgacatgggc gctcgccctg gcgttgcccg cgggtgctgc cgcgagacc aggccgccca 360
cggagcagc ttgctgggct aagctgatgc gtctggcgtg cccggcgccg tcagaaagag 420
cgaggtgccg gagcgaccca ataactgcta tgagggccc agcaacgttg gtgcaggcag 480
cttgacatc agcaagagcc tcatccgcaa ccggcgagg agtgggcagc tggccacgcc 540
cagttcagc gcctggggct cggctgcgtc gttgggtcgc ggaccccagg gtggcccggg 600
actgtcccgc aacggtgtgg gaccggcgcc atcgtgagc gagctggatc 651

<210> 158
<211> 745
<212> DNA
<213> Homo sapiens

<400> 158
ccgctttcta agggggtgtg gctggtctcc ctctggcag agctcagacc tcaggagacc 60
aagtgcctgc ctctccccc cccagagaa caaccatgac aaagcacggg gacattgggg 120
acatcagttg gtgtggtgga gatgcactgg ctccaggac agagagactt cctctcctgt 180
ggggggcctc ctgcttccct tccctgctct gaggatcccc cgtctcagca caggaggggt 240
gcctggaagc ctgggcagat aattgtccct gacctggacc ttagatgttt tcttggtcac 300
cgctccaggt gtacatcatt ggagatgttt tttcaaatgc attttcccag gcaccattct 360
cagaacctca gttccagaat ctccagggtga gacctaggaa tctgaatttt tttacaatgc 420

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tccctgggtga ttctgatgtt cagctatctt tgaaaaataat tggctgagtg ctgtggctcg 480
tgccngtnat cccagcactt tgggaggccg aggaggggca gatcacttga ggtcaggagt 540
tcgagaccag cctggccgac atggcgaaat cctgtctcta ctgaaaacac aaaaaatagn 600
ccgggtgtgg tggcgcgggc ctgtagtccc agctactcgg gagctgagg catgaggatc 660
gcttgagccc ggagggtgga ggttgacgtg agccaagatc acgccactnc actcngctt 720
gggtgataga gcacgactct atctc 745

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<210> 159

<211> 668

<212> DNA

<213> Homo sapiens

<400> 159

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gtctgcagcc ccatcccaag cagggccctg gggcgggatg gctggccatg gcaggactgg 60
gccccaaaagc tgggtctctt ctctgtgttc ccctctctc tgcctntggg gtgtccctac 120
ttgggggttcc ttcttccaga agacctccag agccctggtt agggttgtct ggtcctcgg 180
ccactgcaga agctcccag cagggatgag ctgtgccag cttgggggga atgcattttg 240
agccccctccc aggagggcac ttgggccaga caagaagaag catttccccg gctgggtctg 300
gtgttttgaa cgggaatgcc ctctctggaa agaggtttac agtggggagg tgggggttgg 360
attaaggctc tctactgcg gggatactcg gccctcggtc tccgtcctgg aggactaaat 420
taactttacg ccttcccag aacaacaaat ccgtctctca cgacacattt gcccaggcca 480
acccaggat gccaaaaggc agagtcaggc ctgcggttc gagcttcca accccctcac 540
ggagagcccc gccccaaaca ctgcggtccc aggtcgaggg gagggctctc ggcgcgagcg 600
ggactatcag ggtgacctca cctgtgacct tcaccaccgt gaggtaccgc cgcgcctggg 660
agtcaccc 668

```

<210> 160

<211> 375

<212> DNA

<213> Homo sapiens

<400> 160

```

cttcccttct cgcttgggaa ctctagtctc gcctcggtt gcaatggacc ccaactgtc 60
ctgtgcgct gcagggtgtct cctgcacctg cgccagctcc tgcaagtga aagagtga 120
atgcacctcc tgcaagaaga gctgtgtctc ctgtgcctt gtgggtgtgt ccaagtgtgc 180
ccagggtgtc atctgcaaag gggcatcgga gaagtgcagc tgctgcgcct gatgtcggga 240
cagccctgtc cccaagtaca aatagagtga ccgtgaaat ccaggatttt ttgtttttt 300
ctacaattct gaccctttg ctacattcct ttttttctgt gaaatatgtg aataataatt 360
aaacacttag acttg 375

```

<210> 161

<211> 774

<212> DNA

<213> Homo sapiens

<400> 161

```

gtcgggggag tctgtggact cctccctcag caccacctt ctgccccagc acgacggcca 60
gccctactgc cacaagccct gctatggaat cctcttcgga cccaagggtg agtgtagcca 120
gggtgggtcca cgatgtcttc cctgccctcc ccttccctcc actgttctcc cgaccacccc 180
cagcggcctc cctccacagg agtgaacacc ggtgcggtgg gcagctacat ctatgaccgg 240
gaccccgaaag gcaaggtcca gccctaggct acagcggtc tcatgatgtg ggctcacctg 300
cgccccagac cctgcagggg cccccctgct tggtctgtct gggagagtgc tcagccgccc 360
agttctgcct gcaagcccag ggcgagtatt ggaggagggg cagccacggg cagagcacat 420
gccccatccc gagtctctgg tgtgtctgcc cctcttgga tcctctgggc gtccatgatc 480
ccttctgtgt ctgcgtgtcc gaatccccgt gtgaccctgt ccagcattt tcccgcggac 540
cctgcgtgtc ccgtggcg tgctcgctct cctctcctg ctgccccacc acctgccagt 600
gtattttatg ctcccttctg ggtgatggc cagccctca ccatgtccct ggcagagggc 660
ttccctcgg gatccctgc ctggtgcca cactgcctcg caagcgctcg ccacctcac 720
gtggctcacc tgntgtngac gccttgtgtc gtcaataaac ggtttgagga ttgc 774

```

<210> 162

<211> 712

<212> DNA

<213> Homo sapiens

<400> 162

```

gtaagatgta ttaaaccattg ctaatgatgt atggttacaa tgtataacag gttttccatt 60
gtcataactg tatggaattt tcttggagga tgcattagc ttctgtttgc actgacttgt 120
gagctgtgtg tacgctgtgg tcagatttct gaatgctgta gagcacttac cagctctgac 180
cgtgtcttgc tggggccagc aggtctgctg tgcagcgggg ccagctgtct cagggctgat 240
atgtagacgt gtattctgtt tacaattagt tccccaaactc tgtggggaag aacttaagcg 300
gttttagtgt ttataatat ggtgaggcaa tgagggtcag ggcgctggt ccctgagga 360
gggtcttcag ggcaagacc atggccctgg cctggaactg tgctcccag ggcgtggtgc 420
ctccctaagg ggatggtcag tgttcctggg actgactgcc aggccagccc gtctgcagac 480
tctgtggtg ggagttccct gggacgggaa gcccctcggc ccctccctc caggggcagg 540
aactgagcca gcatgggcgg ggcggccga gcttcaggc gtgttttctc tgttaaatgt 600
acctctgtct ttaagctgtc tcattttcta atcgctggca tgccttgct agaaaagcat 660
ttggaattgc ttatgttcaa ttacagaaat aaaatgtctt acttgccatt gc 712

```

<210> 163

<211> 876

<212> DNA

<213> Homo sapiens

<400> 163

```

cttagaaagc ggccccgagt cgctctctga gaccgcgaag atcttctctg ggaaggcctt 60
ggatgttttg gccatgggtg tgacactata ctgctttgtc tttggccagt gccattcat 120
ggacgagcgg atcatgtgtt tacacagtaa gatcaagagt caggccctgg aatttccaga 180
ccagcccagc atagctgagg acttgaagga cctgatcacc cgtatgctgg acaagaacct 240
cgagtcgagg atcgtggtgc cggaaatcaa gctgcacccc tgggtcacga ggcattgggg 300
ggagccgttg ccgtcggagg atgagaactg cagctgtgtc gaagtgactg aagaggaggt 360
cgagaactca gtcaaacaca ttcccagctt ggcaaccgtg atcctggtga agaccatgat 420
acgtaaacgc tccttttggg aaccattcgg agggcagccg gcgggaggaa cgctcactgt 480
cagcgccctg aaacttgctc accaaaaaac caaccaggga atgtgagtcc ctgtctgagc 540
tcaaggaaagc aaggcagcga agacaacctc cagggcaccg acccgcccc cgtgggggag 600
gaggaagtgc tcttgtgaga ggcagtcctt gcgtggaaag ttgctggggc ccgcccccg 660
gctccccgc acgcatgcat ccactgcggc cggaggaggc catggagccc gagtagctgc 720
ctggatcgct cgacctcgca tgcgcgcgcg gtgcctctg gggggctgct gcaccgcgtt 780
tccatagcag catgtctacg gaaaccagc acgtgtgtag agcctcgatc gtcactctctg 840
gttatttgtt ttttccttg ttgttttaaa ggggac 876

```

<210> 164

<211> 410

<212> DNA

<213> Homo sapiens

<400> 164

```

ggacccttat aagacatggt ttagaaatat tttttccca ttgtgtggac tgtctttgtt 60
tcttggtagt gtcctttgaa gcttaaaatt ttaattttc atgaagtcca gtttatccat 120
tctgctcttg ttgtttgtgc ttttagtgtc agatctaaga aatcatagcc taatccaagg 180
tcatgaaaaa ttacacatat gtcttctaag agttttataa tttggtctcc tatatttga 240
tctttgatcc attttgggtt aatgtttgta tatagtgtgg ggtagaggcc cagcttcata 300
ttttgcattg aaatatccag tcatccagc ataatttgtt gaaaagatta ttctttcacc 360
cattgaattg ttttagtact catcaaaaat aaattaactg tatatgagt 410

```

<210> 165

<211> 628

<212> DNA

<213> Homo sapiens

<400> 165

```

gtgggctcgg gccgctcgcc ttgccgtctc tcgcttcagg aggtcgctac tgccgctca 60
gcggccccgg agcggggggc cccgggggtc ctgcgcccc ggccaaggct cccgcgcgg 120
ggcttcgccc cccccagtgt ccgagctgga tcgtgcggac gcctggctcc tccgaaaagc 180
gcacgagaca gccttcctct cctggttcgg caatggcctc ctggcatcgg gcacgggggt 240
catctccttc atgcagagtg acatgggtcg ggaagcagca tatggcttct tctgctggg 300
cggcctgtgc gtggtgtggg gcagcgctc gtacgcctg ggcctggcgg cgctgcagg 360
accatgcag ctgacgctgg gggcgcgggc cgtgggcggc gggcgcgctg ctggccgcca 420

```

```

gcctgctctg ggcgtgccc gtgggcctct acatggggca gctggagctg gacgtggagc 480
tgggtgcccga ggacgacggg acggcctccg cggaaggccc tgatgaggcg gggtcggccg 540
ccaccgagtg gagggacagg gccgtggggc ctggcaggcg ctggacagcc ccgaaggact 600
gggacattaa acctgacctc cctgttcc 628

```

<210> 166

<211> 520

<212> DNA

<213> Homo sapiens

<400> 166

```

ccaatttgca ctcccacgaa tcctgttacc gtgactatct cgccatgccc tccctagcac 60
tgagcgtgat ctctagtatc attttccatc gttgctaatt tgaacatgag cagatggagt 120
cctattatct ggggtcatta atttcgtagc aagtgcagtt gaagggtgtt tgcattgtca 180
ttgtgcagtg cgcgcgtag tctgcacagt ttggccggca ggtgggatga agggcggggc 240
tggcgaggcg cgcgcgccc ctggtaggcc agttcgagc ggagccaacg ctatcccgcc 300
ccccacggcc agggggcgct gcggccccc caatccccc ccccgcccg gctggggcgg 360
aggagcgggc ggggacaaa ggttggtgtc tttgcgctcg gaccttcgcc agagggggcg 420
ggacatcatg acggtgggag ccaggctccg aagcaaggcg gagagcagcc tctgtcgccg 480
cgggccccga gggcgagggc gaaccgaggg ggacgaggag 520

```

<210> 167

<211> 676

<212> DNA

<213> Homo sapiens

<400> 167

```

aagaaattca gtcgaacagc ccaccagttc tctccatagg gacctgggtc ccgtgaatgc 60
tggttatctc acaccctgag gaataaagat tggaaatccg actggatgct ggaagttgac 120
tcggagaaaa ttgcgacagg agggaaatgg cggctctgca aaagttgcca cactgcagaa 180
agctggtcct gctgtgcttc cttttggcga ccctgtggga ggccagggcc gggcagattc 240
gctattctgt gcgggaagag atcgacagag gctccttcgt aggcaacatc gccaggact 300
tgggtttgga gcccctggca ctggcagagc agggagtccg catcgtctcc agaggtaggt 360
cccagctctt tgctctgaac ccgcgaagcg gcagcttggg cactgcgaac aggatagacc 420
gggaggagct ctgcgctcag agcgcaccct gtctgttgaa ttttaacatt ctgctggagg 480
ataaattgac tatttattca gtagaggtag aaataacaga tattaacgat aatgcccctc 540
gctttggagt agaggaaact gagctaaaaa tcagtgaaac caccacccc tcttctgtg 600
tctcacgcaa gttttatact ctaatatatta tatggctttt tttcttcgac aaaaaataa 660
taaaacgttc tcttnt 676

```

<210> 168

<211> 691

<212> DNA

<213> Homo sapiens

<400> 168

```

cccagagaat gggctttgca tggagcttgg ctccgtgtcc tgctgtgag ggaggaccag 60
actcggcctc accacctgcc actctgagca aacaggcaac ggtgtttcct gaacatcttt 120
ctgaagcggc tgagggatgt cagctgagcc cccgctgggc ctgctctgga ggggatgtc 180
tccagaagcc gcccttggag cgggcacttc cctatttggg cgtgtcccag tccatgcct 240
caccatcccc ttgcttgaag ctccaagagc atgagagtgg gcagcctggt ctgctgagga 300
aagtgtctga tggatgcgga aatggccacc ccaaacaccg gtaagcagat gttaccctgc 360
aggcggtggc tcctggggcc cagccctgca gaaacacatg gggcaggctg ggcagagggg 420
ctcacacccg ataatcccag cactttggga ggctgagggt ggaggatcgc ttgagcccag 480
gagtttgaga ccagcctggg caacatagca agactctatc tccactaaaa atcaaaacaa 540
aacaattagc tgggtatggt ggcacacgcc tgtggttcca gctactgggg aggctgaggg 600
ggaggatcac ttgagcccag gagttcaagg ctgcagttag ccattgattgc gccactgcac 660
tccagcctgg gcaacagagc aagcttagaa a 691

```

<210> 169

<211> 693

<212> DNA

<213> Homo sapiens

<400> 169

```

tgagacgcag acttgagaat tcttttcaaa ttcaagagca gtagtttgtc tcaggagatg 60
ctggctcctgt ctcaactgtga gaatccctat catagacctt cccgggcaaa gccctttccc 120
gggttcctcctgt ctgaggagggt aggtgaagcc tcttgggtcc tcaagcagcg attcttacct 180
tttccctgcc tgggtcactg cccatccaca gcttcccggt gagaacagtg acgggaacta 240
gctgaccgct cggagcctcc agggcagtc ctttctgtga agactcaca ggccttactc 300
gttgcgtaac atcccaaagc cgtagttaag tcatctgtaa aatggagata aaaatccac 360
ttcacatggt tgttgggggtg attaaaggag ataatatagg ccaggcatgg tggctcgcg 420
ctgtgggtccc agcaccttgg gaggccgagg cgggcaaatac acctgaggtc gaaccttgag 480
gtcgggagtt tgagaccagc ctgaccaaca tggggaagcc cgtctctac taaaaataca 540
aaattatctg ggcgtgggtg tgcatgcccg taatcccggt tgccctggggg gttgaggcag 600
gagaatcact tggacctggg aggcggaggt tgcagtgagc tgagatcatg ccattgcact 660
ccagcctggg tgacaagagc aaacctccat ctc 693

```

<210> 170

<211> 681

<212> DNA

<213> Homo sapiens

<400> 170

```

ttttttggca ggaaatggca ctttaatagt tggggccagg gtgacaggac caagatgggg 60
ctggcctgtg tcagtcagga agcctccctc ttctgctggg acagggcctt gcggcagctc 120
ctcctccccg cctgagggtcc taggcctgcc acaggccagc atgccggtga ggtcagtggtc 180
aggagccacc cagaagcccc gcagatgacg gagctgagaa cagggacttc acctccactg 240
gttgccattt cctcactgga aagtccttgg gaggtggctg ggctcagcct gagctcaggg 300
ctcttcgggtg ggggttgggg caggggcagg gcgggcactt gcagggtggca caggcttcat 360
caaggcagga cacgggcttc atcaaggcag gagccacagc gcccagagccc tggcaggggg 420
ggtaaggccc aggatggggc agggccgtgt gtcctggaa cggacatcct tctctgccag 480
agacctgtc cccaagccct gtccctccca atccccagc agccactct gccctccata 540
gatgaatcta atcccatata ttacaataaa ctgcatttgc ctctcccat tgccccacc 600
tcccctacc tgggccagcg gcccctactt ccttgtcctc tggcggtggc aggtgccct 660
cctcaagcag tgccacagaa a 681

```

<210> 171

<211> 798

<212> DNA

<213> Homo sapiens

<400> 171

```

cgaggctgag cggcaggcgg atcgccccga ccctcactcc tggcgtctga gtctctggcg 60
tagcccatgc tgagtgggag gctgggtcctg ggtctgggtc ccatggctgg ccgcgtttgt 120
ttgtgccagg gcagcgcggtg atccggggcc atcggtccgg tggaggccgc cattcgacg 180
aagttggagg aggccttgag ccccgaggtg cttagacttc gcaacgagag cggttggccac 240
gcgggtcccg cctggcagtg gactcacttc cgcgtggctg tggtagctc tcgtttcgag 300
ggactgagcc cctacaacg acaccggctg gtccacgcag cgctggccga ggagctggga 360
gggtccgtcc atcgctggc catccaggca cggacccccg cccagtggag agagaactct 420
cagctggaca ctagcccccc atgcctgggt gggaacaaga aaactctagg aacccccga 480
accccaagag agggaggacc aggatccgaa tgagctgggt gagcacgaat taccgaggcc 540
ttccctttga tacagtccag gatttgaag ggatgaagac ccctgggccc cattctgttg 600
gggtccatac atactctccg aagatagcaa cttgcttcag gtcaaagtga acccgagaaa 660
agagaagaat cactcactac tgctcttgcc ctggactatt caggaaggcg agcccgatg 720
ttccatgtta aatcgtgaca gaattgcacc agacctgatg agttggaaac aatcctatac 780
attaaaagaa attacccc 798

```

<210> 172

<211> 697

<212> DNA

<213> Homo sapiens

<400> 172

```

gatggcggtg gcagctgtac agggcggtgag aagcggtggt agcgagggt gtagtggggc 60
tggtggtgct tccaactgcg ggacaggaag tggccgtagc ggcttgttg ataagtggaa 120
gatagatgat aagcctgtaa aaattgacaa gtgggatgga tcagctgtga aaaactcttt 180
ggatgattct gccaaaaagg tacttctgga aaaatacaaa tatgtggaga attttggtct 240

```



```

aattgatggt cgcctcacca tctgtacaat ctctctgttc ttgccatag tggctttgat 300
ttgggattat atgcacccct ttccagagtc caaacccgtt ttggctttgt gtgtcatatc 360
ctatthttgtg atgatgggga ttctgacctt ttatacctca tataaggaga agagcatctt 420
tctcgtggcc cacaggaaag atcctacagg aatggatcct gatgatattt ggcagctgtc 480
ctccagtcctt aaaagggtttg atgacaaaata caccttgaag ctgaccttca tcagtgggag 540
aacaagcag cagcggggaag ccgagttcac aaagtccatt gctaagtttt ttgaccacag 600
tgggacactg gtcatggatg catatgagcc tgaaatatcc aggcctccatg acagtcttgc 660
catagaaaga aaaataaagt agccaattct taaagtg 697

```

<210> 173

<211> 735

<212> DNA

<213> Homo sapiens

<400> 173

```

cacgacgcag acatggcagc gcagaaggac cagcagaaag atgccgaggc ggaagggctg 60
agcggcacga ccctgctgcc gaagctgatt ccctccggtg caggccggga gtggctggag 120
cggcgccgcg cgaccatccg gccctggagc accttcgtgg accagcagcg cttctcacgg 180
ccccgcaacc tgggagagct gtgccagcgc ctgctacgca acgtggagta ctaccagagc 240
aactatgtgt tcgtgttcct gggcctcatc ctgtactgtg tggtgacgtc ccctatgttg 300
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tccaagcttg tgctctttgg ccgagaggtg agcccagcgc atcagtatgc tctggctgga 420
ggcatctcct tccccttctt ctggctggct ggtgcgggct cggccgtctt ctgggtgctg 480
ggagccaccc tgggtgtcat cggctcccac gctgccttcc accagattga ggctgtggac 540
ggggaggagc tgcagatgga acccgtgtga ggtgtctttt gggacctgcc ggcccccccg 600
gccagctgcc ccaccctgc ccatgcctgt cctgcacggc tttgctgtc gggcccacag 660
cgccgtccca tcacaagccc ggggagggat cccgcctttg aaaataaagc tgttatgggt 720
gtcattcagg aacctc 735

```

<210> 174

<211> 664

<212> DNA

<213> Homo sapiens

<400> 174

```

ttgggtgttg agtttccag cgccctcctg gtcogaccct ttgagcgttc tgctccggcg 60
ccagcctacc tcgtccctcg gcgccatgac cacaaccacc accttcaagg gagtgcagcc 120
caacagcagg aatagctccc gagtthttgc gcctccaggt ggtggatcca atttttcatt 180
aggthttgat gaaccaacag aacaacctgt gaggaagaac aaaatggcct ctaatatctt 240
tgggacacct gaagaaaatc aagcttcttg ggccaagtca gcagtgacca agtctagtgg 300
tggaagggaa gacttggagt catctggact gcagagaagg aactcctctg aagcaagctc 360
cggagacttc ttagatctga agggagaagg tgatattcat gaaaatgttg acacagactt 420
gccaggcagc ctggggcaga gtgaagagaa gcccgtgcct gctgcgctg tgcccagccc 480
ggtggccccc gcccagtgcc catccagaag aaatccccct ggcggcaagt ccagcctcgt 540
cttgggttag ctctgactgt cctgaacgct gtcgttctgt ctgtttcttc catgcttgtg 600
aactgcacaa cttgagcctg actgtacatc tcttggattt gtttcattaa aaagaagcac 660
ttcc 664

```

<210> 175

<211> 829

<212> DNA

<213> Homo sapiens

<400> 175

```

gcgggtgcta gctagtcctt tctctctgct gctcggctcg cggcccgctg ggtcggcccc 60
gccaccgttg ccgccatgcc catgaagggc cgcttcccca tccgcgcac cctgcaatat 120
ctgagccagg ggaacgtggt gttcaaggac tccgtgaagg tcatgacagt gaattacaac 180
acgcattggg agctgggcga gggcgccagg aagtttgtgt ttttcaacat acctcagatt 240
caatacaaaa acccttgggt gcagatcatg atgtttaaga acatgacgcc gtcacccttc 300
ctgcgattct acttagattc tggggagcag gtcctggttg atgtggagac caagagcaat 360
aaggagatca tggagcacat cagaaaaatc ttggggaaga atgaggaaac cctcagggaa 420
gaggaggagg agaaaaagca gctttctcac ccagccaact tcggccctcg aaagtactgc 480
gtgcgggagt gcatctgtga agtggaaggg cagggtgcct gcccagcct ggtgccatta 540
cccaaggaga tgagggggaa gtacaaagcc gctctgaaag ccgatgcccc ggactaaggc 600
ccacggtcac tgtgggctgg ggtgatgggt tctgaccagt ggggagattg gaatgggatt 660

```

```

actttggccc agggaagccc ctggttctgt ccctggagac tctggaaatc cttttgcatt 720
aaaaggactt tacacacctg tgtaaaagga tgtgggagag gagggctctga agctgagctg 780
ctaaatgaat atccctgctc tgctgggtcaa taaaacgctt cctaataagc 829

```

<210> 176

<211> 827

<212> DNA

<213> Homo sapiens

<400> 176

```

ggcgcgtttt tttttttttt tttttttttt tttttggctt ttaagtgttt ttttgtttgt 60
ttttgttttt tgtttttttt ttggaacagt ctggtccctg atgggggcct ctccccctgc 120
ccctcccccag tctggttaca gctcagttcg tcgctctatt ttgagcagct ccacctcgaa 180
caccagggtt gcaccgctg gaatctttgg gggagctccc cgctctccat accctagctc 240
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gcccttgatg acctggcctg tgccaaggga gaagacaaaag ggctggttct ggggcaggct 360
gctgtcaaac tctgtcccat ctccagctt ccccggtgtag tgcatgtgca ggacatcccc 420
tttgcgcat ttgatgggac agtgggtccac ccgcttcttg accccgatct gcagcttctc 480
tttgccctcg gcccggtggc cgtggccacg gcgctcaggc agatggacag tactgtcagg 540
accgggaacc agctcagcct catgtctcag tccagtgaag agggggcttg gccgaggacc 600
ccagcagcgg gggggggggg tcaggggagg ccacagcagc caggggacccg cccctttgct 660
cacccccata ccttccctcc ctcccagtc ccacctccgc tcttcagttc ccgctgtcc 720
ctttacgcaa agtccagacc ctatctggct gcactgcagt tgccccaact gggcggcccc 780
actcacgcca caccagctg cccccgttc agcacaccaa cacctct 827

```

<210> 177

<211> 1305

<212> DNA

<213> Homo sapiens

<400> 177

```

gcgtccctt tccggccggt ccccatggag gcgctgggga agctgaagca gttcgatgcc 60
taccccaaga ctttggagga ctcccggtc aagacctgcg ggggugccac cgtgaccatt 120
gtcagtggcc ttctcatgct gctactgttc ctgtccgagc tgcaagtatta cctcaccacg 180
gaggtgcacg ctgagctcta cgtggacaag tcgcggggag ataaactgaa gatcaacatc 240
gatgtacttt ttccgcacat gccttgtgcc tatctgagta ttgatgccat ggatgtggcc 300
ggagaacagc agctggatgt ggaacacaa ctgttcaagc aacgactaga taaagatggc 360
atccccgtga gctcagagcc tgagcggcat gagcttggga aagtcgaggt gacggtgttt 420
gacctgact cctggaccc tgatcgctgt gagagctgct atggtgctga ggcagaagat 480
atcaagtgt gtaacacctg tgaagatgtg cgggaggcat atcgccgtag aggctgggcc 540
ttcaagaacc cagatactat tgagcagtc cggcgagagg gcttcagcca gaagatgcag 600
gagcagaaga atgaaggctg ccaggtgtat ggcttcttgg aagtcaataa ggtggccgga 660
aacttccact ttgcccctgg gaagagcttc cagcagtcac atgtgcacgt ccatgacttg 720
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gggggcatgt tcacagtggc tggactcatc gattcgctca tctaccactc agcacgagcc 1140
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cctctttctc cctggcctgt ggttgtcccc cagcctctgc caccctccac ctctcggtc 1260
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```

<210> 178

<211> 907

<212> DNA

<213> Homo sapiens

<400> 178

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tttttttttg tgtaaaaaga gtcaacaaca caccctttta gccaaagaaa aaaatacatc 60
aggaggggaca gtcacaattg agtagactga gaggaggcgt gaggggctgg accagagggc 120
caggagggag cgaggcgtga tggggtgagg gccccctcc cagcgcctgg agatggggag 180
gagtgaata ggctgtgggt agcagctgct gcgagctctc accccgacca aagcagctgc 240

```

```

tctctctgtg cccaggccca gcccatgetc tgtggccatg cacctagcag gcacctagcg 300
ggacagtggc gtctgcttca gggacatgag caccgagcgc aggcgggaca catctttgca 360
ctgcttgctg ctcttggggg tgaagtcaca tagctgggccc accttctccc actctgtgccc 420
tggggctctcc tecttggatt ccttcacgaa agcctcctcg gatgccacgt agccgatgat 480
atcagcatct ggctgctggt agaattgcttt gtcagcgatc cggttgttga tcttgttctt 540
ctctacttgt tcaactctggc gctgggttcca ctctccagg tcttcttgg ccttctccc 600
ccattctctgt tccgtgacct tagatgcagc atccagctct tgcagccgtt tctctgtctc 660
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tgcgtagcca tcagcaggac cgttggcctc ctgaaacaca tctccattga ctgtgggtccc 780
catgtcctca gaaccagccc cactcgtggg gcccggtctg cggggggccg catgggtgccc 840
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caggaag

```

<210> 179

<211> 770

<212> DNA

<213> Homo sapiens

<400> 179

```

atggcagggtg tcggggctgg gcctctgagg gcgatggggc ggcaggccct gctgcttctc 60
gcgctgtgag ccacaggcgc ccaggggctc tacttccaca tcggcgagac cgagaagcgc 120
tggtttcatcg aggaatccc cgacgagacc atgggtcatcg gcaactatcg taccagatg 180
tgggataagc agaaggaggt ctctctgccc tcgacccctg gcctgggcat gcacgtggaa 240
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acgttcacct cccacacgcc cggtgacct caaatctgtc tgcactccaa ttctaccagg 360
atggctctct tcgctggtgg caaactgagg gtgcatctcg acatccagg tggggagcat 420
gccacaact accctgagat tgctgcaaaa gataagctga cggagctaca gctccgcgcc 480
cgccagttgc ttgatcaggt ggaacagatt cagaaggagc aggattacca aaggatcgt 540
gaagagcgct tccgactgac gacgagagc accaaccaga gggtcctatg gtggtccatt 600
gctcagatct tcatcctcat cctcactggc atctggcaga tgcgtcacct caagagcttc 660
tttgaggcca agaagctggt gtagtgcctt ctttgtatga cccttccctt ttacctcatt 720
tatttggtac tttcccaca cagtccttta tccacctgga ttttagggg 770

```

<210> 180

<211> 745

<212> DNA

<213> Homo sapiens

<400> 180

```

cttttttttt tttttttttt tttttttttt gaggaataa tcaaacttat ttatttacia 60
gtgatttaca gttagaaaac ccaggcaggg gtatgggcag ggtccgaatg tgggatggca 120
cttgggctct ggcaggctcac ttgtctgcac ggacgaagga ggcgaagacg ctgtccttcc 180
ggctgagcag cttctctggc ttatcgaaact caaggatggc accccgcttc aggacgatca 240
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cgaaggctgt catcaccacc ttttggaagg tgttttccgt ggccatgtca atggaagccg 360
tggcctcgct catgatgaag atgctggtct tctcaccgaa ggcggggccc aggcagaaca 420
gctgcctctg tccctggctg aaattctccc cgccttctgt gatgatggca tcagggcctc 480
ctggcagtgct cttcaccacc agcttcagct gggcgatttc cagggcctcc cacagtgtgc 540
tatctgagca cttcctctca ggggtccagg taaatcggat ggtgcccgtg aagaggacgg 600
ggtcctgcag gatgatggag aggcgtgagc gcagggtgtg cagcggcagc ttggcgatgt 660
caatgccatc aatgatgatg tgcccttcga acgtgtccac catgcggaag aaggcaagag 720
agaaggagga cttccactg ccggg

```

<210> 181

<211> 891

<212> DNA

<213> Homo sapiens

<400> 181

```

gccgccaatgc cggaaacggag ggagctgtgt ccagcctggc cgctgccgct gccctgcagg 60
atggcgggggt gacacttgcc agtcagatgt ggatgaatgc agtgctagga gggcgggctg 120
tccccagcgc tgcgtcaaca ccgcggcag ttactgggtc cagtgttggg aggggcacag 180
cctgtctgca gacggtaac tctgtgtgcc caaggagggg cccccaggg tggccccc 240
cccagacagga gtggacagt caatgaagga agaagtgcag aggctgcagt ccagggtgga 300

```

```

cctgctggag gagaagctgc agctggtgct ggccccactg cacagcctgg cctcgagggc 360
actggagcat gggctccccg accccggcag cctcctggtg cactccttcc agcagctcgg 420
ccgcatcgac tccctgagcg agcagatttc cttcctggag gagcagctgg ggtcctgctc 480
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ctgcgggcccc catgcccctg cccnacatgc tgggggtcca gccgccacct cggggtgact 600
gagcggaagg ccaggcaggg ccttctcctc tttctcctc ccttctcctg ggaggctccc 660
cagaccctgg catgggatgg gctgggattt tttctgtgaa tccaccctg gctaccccc 720
ccctggctac cccaacggca tccaaggcc aggtggggcc tcagctgagg gaaggtagca 780
gctccctgct ggagcctggg acccatggca caggccaggc agcccgaggg ctgggtgggg 840
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```

<210> 182

<211> 599

<212> DNA

<213> Homo sapiens

<400> 182

```

cacgctcacc atgatgagtg ttgaccgcta catcgtgtgc tgccaccctg tcaaggccct 60
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aggcgttggc gtgcccatac tggatcatggc tgtgaccctg cccgggagc gggcagtggt 180
gtgcatgctc cagttcccca gcccagctg gtactgggac acggtgacca agatctgcgt 240
gttctctctc gccttcgtgg tgcccatcct catcatcacc gtgtgctatg gcctcatgct 300
gctgcgcctg cgcagtgtgc gectgctgtc gggtccaag gagaaggacc gcagcctgcg 360
gcgcatcacg cgcagtgtgc tgggtgtgtt gggcgcttc gtggtgtgtt gggcgcccat 420
ccacatcttc gtcacgtctt ggacgctggt ggacatcgac cggcgcgacc cgtggtgtgt 480
ggctgcgctg cactctgtga tcgcgctggg ttacgccaat agcagcctca acccctgctt 540
ctacgcttct ctcgacgaga acttcaagcg ctgcttccgc cagctctgcc gcaagccct 599

```

<210> 183

<211> 941

<212> DNA

<213> Homo sapiens

<400> 183

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tttttttttt tttttttttt tttcgtgttc caacaaaact ttatttaca aaacaggaag 60
caggcacggtt tggccctcag actgtaatct tcccatcact actottaatg atactcagat 120
gacctggctg cctgaggggg ctgtggccct gtctgattct ctgtgagatg gaaaccactc 180
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gtttctgacc aagtgggtgac agcagagggc aaaaactgaa ggctgtgctg gataaggctg 300
aaccttcttc ataagcaaca ccaactgctt tattccaggt cagggccaac tcttccgcca 360
tgatacatatc atggtccctg gcgggcactg tcttactagg gcccttagga gtccctgcgt 420
tgtggcctga ccaccagccc ctctctggtg atggccaggt tgtagttctt ccgggagtc 480
aatgtgcttt ccaccctgct ctccaggttc tctcgggtga tgaagttttt cactcttcc 540
tgcagctgca gcaattcccg ctccctgctg tgcccccagg cctgcacctc ttcggccttg 600
cgggcctgct ccaacgcctg ccgctgctcc tgcctccgct cctcctgccc cagcctcgct 660
atccgcagct cgtgcagccg ccggttctcc gctggttccc aggccatcag ctgcggtgct 720
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ttcctctgca cctcggaacac gaactccatc ctgagggcgc gcacggtctg gcggtagtgc 840
tggtaacgct ccatcagcac gaagaactcc gcagggtcca ccgcgggcgg catgttctact 900
cgctcgatct tggatttggc cagcgggtcg tggcgggtct t 941

```

<210> 184

<211> 785

<212> DNA

<213> Homo sapiens

<400> 184

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accgcccagc agccagtggg ttcccgcgcg tgccgagact ctgaggcctt gcacccccac 60
gatcccgtac gatggccgctc aagaagatcg cgatcttcgg cgccactggc cagaccgggc 120
tcaccacctt ggcgcaggcg gtgcaagcag gttacgaagt gacagtgtg gtgcccggact 180
cctccaggct gccatcagag gggccccggc cggccacagt ggtagtggga gatgttctgc 240
aggcagccga tgtggacaag accgtggctg ggcaggacgc tgtcatcgtg ctgctgggca 300
cccgaatga cctcagtcct acgacagtga tgtccgaggc cgcccggaac attgtggcag 360
ccatgaaggc tcatggtgtg gacaaggctg tggcctgcac ctgggcttct ctgctctggg 420

```

```

accctaccaa ggtgccccca cgactgcagg ctgtgactga tgaccacatc eggatgcaca 480
agggtgctgcg ggaatcagggc ctgaagtacg tggctgtgat gccgccacac ataggagacc 540
agccactaac tggggcgtag acagtgaccc tggatggacg agggccctca agggtcattc 600
ccaaacatga cctggggccat ttcattgctgc gctgcctcac caccgatgag tacgacggac 660
acagcaccta cccctcccac cagtaccagt agcaactctgt ccccatctgg gagggtagga 720
ttctgggaca tgaggagcaa aggaaggggg caataaatgt tgagccaaga gcttcaaatt 780
actcc 785

```

<210> 185

<211> 377

<212> DNA

<213> Homo sapiens

<400> 185

```

gccagtctcc tggagatgct tgaggatcgg tcctccccag aaccaggcca ggacgttgcc 60
cctggggcct ggtgaccctg tgaggtcggg tccccagat tgacgtctga gtgtgggcaa 120
gtgtgtcaaa aggggctgcc cccagggga gatgaggctg agagcaggga gttgaggcgg 180
aagaagtcaa ggccctccc gcaaatgtgt acccctgccc gcgcactgc accccgcgcg 240
acccccacct ccccgggggg ccctgctgcg gatgccggag tgggagagtc tctgagctgt 300
gagattgatc ttgcccctaa ttggagagga agccggggcg caagacacac ggggctcctg 360
ccttgggagc cagggcc 377

```

<210> 186

<211> 848

<212> DNA

<213> Homo sapiens

<400> 186

```

gccgcttttt tttttttttt tttttttttt tttttgggaa ataaacactc agttctttat 60
atattttaat caagtaggaa acacagttca tataatggta ttactttttg tatttttttt 120
gttttttagca gctgcttact gtttttatag gtggataaag tggacaacat ccagcgatgg 180
gtggcaagtc aagaagagaa actgtcagtt ggtggagggt ctgtgggtgg tgctcccttg 240
gagttaacag gttttttttt ttttttaact ttttaacttt ttattttctc tctttcttta 300
cagtatatat tctgtgtgtg tggctgtgtg tgtgtgtgta tgcattgtgt tgtgtgtggg 360
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gcagcgggcg tctcctcctg ctgctgctgt tgctgctggg gaagctgctc acaggcagcc 480
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tgtccgaact tggccacac cttgtagggc acggtgatgg agttgcgata ggtgggcttc 600
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ttgttgtcca cagtcaagga ggtgccctcg ggcagctcgg ccggctcctc ctccactccg 720
tagtcgtcga tgagcttggc cagagcgtca cggaaactga tgagccctg cgcgggcagc 780
gcaatggtct ggccctcgct ggagcccagg ccaggccccc ggttgaccgt ctggcggatg 840
cgcaggaa 848

```

<210> 187

<211> 644

<212> DNA

<213> Homo sapiens

<400> 187

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aggctgaggg cacatcttgc ccttcccctc tcagacatgg ctctcttatt gctggaagag 60
gaggcctggg agttgacatt cagcactctt ccaggaatag gacccccagt gaggatgagg 120
cctcagggtc ccctccggct tggcagactc agcctgtcac cccaaatgca gcaatggcct 180
ggtgattccc acacatcctt cctgcacccc ccgaccctcc cagacagctt ggctcttgcc 240
ccttacatga tactgagcca agcctgcctt gttggccaag ccctgagtgg ccactgccaa 300
gctgcgggga agggtcctga gcaggggcat ctgggaggct ctggctgcct tctgcattta 360
tttgcccttt ttctttttct ctgcttctta aggggtgggt gccaccactg tttagaatga 420
cccttgggaa cagtgaacgt agagaattgt ttttagcaga gtttgtgacc aaagtacag 480
tgatcatgg tggtttggca gcagggaatt tgtctgttg gagcctgctc tgtgctcccc 540
actccatttc tctgtccctc tgcctgggct atgggaagtg gggatgcaga tggccaagct 600
cccaccctgg gtattcaaaa acggcagaca caacatgttc ctcc 644

```

<210> 188

<211> 849

<212> DNA

<213> Homo sapiens

<400> 188

```

cttagaaagc ggccgctttt tttttttttt tttttttttt tttttacccc agggcaaata 60
tgtaatttta ccaaaagcac acaccccccc cccagcatg cactgcctgg ggagagggca 120
gggccagggc cccacacacc cgagaccctc aggggcagca ggagggacgg ggccagggca 180
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ttggctgcgt tccacggggg gagacttcat attggacca ctccagggcg ttgggctggg 480
aggcttccca cggcggcggg gacccctctt ggagagcgac tcagagaaat cctocaaatc 540
gctgcaggag ctggcagacg agcagcggct gcggaaactg tccactgagg agctgcgggt 600
tcgggagcgg ttagggggcgt cccctcggcc agtcaaggca gcagggggcc gggtctggcg 660
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ctgcttcacg tggatctctc tctgcttcct ttcttgggt ttacaaaagg ccgtggagtc 780
gaagcggagc gcgcgaccac ctgtgggcga gggcgagggg cgcgcagggc ggccccgagc 840
cccgtccc

```

<210> 189

<211> 686

<212> DNA

<213> Homo sapiens

<400> 189

```

atttcagagg atggactaaa tttcctagga tttccattaa gaattaagaa aaaagctcta 60
agcacgcagg gtagccagac agacatggat atgagatggc actgtgaaaa ctgcagacc 120
acagatgaca tccttgtggc ctacgcagag tgtccagcg atgatgagga cattgacccc 180
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gccgcctgtg gcaccttat cctcctctat gccatgtaca agtacagaaa ccgggatgaa 360
ggctcataacc atgtggacga gagtcgaaac tacatcagta actcagcaca gtccaatggg 420
gctgttgtaa aggagaaaca acccagaagt gcgaaaagct ccaacaaaaa taagaaaaac 480
aaggataaag agtattatgt ctgatcccaa gatcttaaat ggacacttgt atagaaatag 540
tctcatcttt atctgagaca taatataaac ttatttactt tcccttttat gaagcacata 600
caaaaagaaga cagagaatgc aatcaggaag gaaagacttt ttaaaaaata aaaacaagta 660
tctcatgctc ttgtttctcc aaaaag

```

<210> 190

<211> 782

<212> DNA

<213> Homo sapiens

<400> 190

```

tcccacacca ctggcaccag gcccgggaca cccgctctgc tgcaggagaa tggctactca 60
tcacacgctg tggatgggac tggccctgct gggggtgctg ggcgacctgc aggcagcacc 120
ggaggcccgag gtctccgtgc agcccaactt ccagcaggac aagttcctgg ggcgctgggt 180
cagcgcgggc ctgcctcca actcgagctg gctccgggag aagaaggcgg cgttgtccat 240
gtgcaagtct gtggtggccc ctgccacgga tgggtggcctc aacctgacct ccacctctct 300
caggaaaaac cagtgtgaga cccgaacctt gctgctgcag cccgcggggg cctcgggtc 360
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cgcctctctg aaggcccgag gcttcacaga ggataccatt gtcttctctg cccaaaccga 600
taagtgcagc acggaacaat aggactcccc agggctgaag ctgggatccc ggccagccag 660
gtgaccccca cgtcttggat gtctctgctc tgttcttcc cccagccctt gcccggctc 720
ccgcctaaag caccctgccc cactcgggct tcactctgca caataaactc cgaagcaag 780
tc

```

<210> 191

<211> 772

<212> DNA

<213> Homo sapiens

<400> 191

```

ctttatttta aatagattta atttaggaaa gctcatttta tatgagtttc caactaatta 60
ttagagtcag aaacaaagaa aataaaatca gagaaaaatcc tctgtagaaa aaatacacaa 120
agaacatttc tacatgtgaa aaaacagtaa acagtgttaa catccaagtt attagtctca 180
attccacgtc tcttagtgaa caccactatc aaccttgaga tctgatttgt tcttgctatt 240
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gtggcaacca actatctcaa caagttgtgc tttattaagt cctgggtctgg ttggtagctt 360
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gaagctggcg ttgcctgcg cccggccgca ccgctcacca tctctccgca ggcagcacag 660
ttgccgggg cccggcccg cccggcccg gggcccgcc gctgagaccg ccccgcgcc 720
cggcacctca gcccgggtgc ccgcccgggt cccgttcccc gccgaggcgg cg 772

```

<210> 192

<211> 774

<212> DNA

<213> Homo sapiens

<400> 192

```

ctctcccaca ccaactggcac caggccccgg acaccgcctc tgctgcagga gaatggctac 60
tcatcacacg ctgtggatgg gactggccct gctgggggtg ctgggcgacc tgcaggcagc 120
accggaggcc caggtctccg tgcagcccaa ctccagcag gacaagttcc tggggcgtg 180
gttcagcgcg ggcctcgcc ccaactcgag ctggctccgg gagaagaagg cggcggtgtc 240
catgtgcaag tctgtggtgg ccctgccac ggatggtggc ctcaacctga cctccacctt 300
cctcagga aaacagtgag agaccgaac catgctgctg cagcccgcg ggtccctcgg 360
ctcctacagc taccgagtc cccactgggg cagcacctac tccgtgtcag tggtaggagc 420
cgactacgac cagtacgcgc tgctgtacag ccagggcagc aagggccctg gcgaggactt 480
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caccgccttc tgcaaggccc agggcttcac agaggatacc attgtcttcc tgccccaaac 600
cgataagtgc atgacggaac aataggactc cccagggtcg aagctgggat cccggccagc 660
caggtgaccc cacgctctg gatgtctctg ctctgttctt tccccgagcc cctgccccgg 720
ctccccgcca aagcaaccct gccactcgg gcttcactct gcacaataaa ctcc 774

```

<210> 193

<211> 771

<212> DNA

<213> Homo sapiens

<400> 193

```

accaggcccc ggacaccgc tctgctgcag gagaatggct actcatcaca cgctgtggat 60
gggactggcc ctgctggggg tgctgggcca cctgcaggca gcaccggagg ccaggtctc 120
cgtgcagccc aacttccagc aggacaagtt cctggggcgc tggttcagcg cgggcctcgc 180
ctccaactcg agctggctcc gggagaagaa ggcggcgctg tccatgtgca agtctgtggt 240
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tccccactgg ggcagcact actccgtgtc agtgggtggag accgactacg accagtacgc 420
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<210> 194

<211> 835

<212> DNA

<213> Homo sapiens

<400> 194

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tctgaagggg   atgctgcaag   ccgagaagct   gacctcctcc   tcagagaaag   cactggccaa   300
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ggcggaccag   aacctggaga   aactgaagac   ggagtgcag   cgtctggagc   agcacacgca   720
gaagtcagtc   aactggctgc   tctgggccat   gctcattatc   gtctgcttca   tcttcattag   780
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<210> 195

<211> 602

<212> DNA

<213> Homo sapiens

<400> 195

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gagttgaatg   gatcgagca   gttaccattg   ctgctgggac   agctgcaatt   ggttatctag   180
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<210> 196

<211> 835

<212> DNA

<213> Homo sapiens

<400> 196

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aaggtgtcat   ccaacagtgc   tcatttataa   atatatatag   agagagggtt   gttttttaat   180
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<210> 197

<211> 842

<212> DNA

<213> Homo sapiens

<400> 197

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agcgcagggg   gcgcgcgcta   ctgctgctgg   tgcagggcaa   gggcgaggcc   gcctgccagg   300
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cagagctgga agctgagggc tctaaagagg ctgaaccgga gccggagcca gagccagagc 600
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aggcgggtgcc ccgcccattgc tggataggac ctgggatgct gctggagctg aatcggtatgc 780
caccaaggct cgggtccagcc caataccgct ggaagtgaat aaactccgga gggtcggagc 840
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<210> 198

<211> 749

<212> DNA

<213> Homo sapiens

<400> 198

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ggacaagtcc ctggggcgct gggttcagcg gggcctcgcc tccaactcga gctggctccg 180
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caaggccctt ggcgaggact tccgcatggc caccctctac agccgaacct agaccccgag 480
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cattgtcttc ctgccccaaa ccgataagtg catgacggaa caataggact cccaggggct 600
gaagctggga tcccgccag ccaggtgacc cccacgctct ggatgtctct gctctgttcc 660
ttccccgagc cctgccccg gctccccgcc aaagcaacct tgccactcg ggcttcatcc 720
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<210> 199

<211> 440

<212> DNA

<213> Homo sapiens

<400> 199

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tccctacttt gccactcagt agtgcatgac tttggccaaa tttcttaaact tcatgaagca 180
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tctaacctga atcgaggagc aaccagtaag ctaccctttt accatcattg gacaagtagc 360
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<210> 200

<211> 829

<212> DNA

<213> Homo sapiens

<400> 200

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gctgcagctg ctggtggggg tgcccctgga gatggtgcat ggagccacc gaattgggct 180
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gggagggggg ggaagagcag caccacagc gagcgctgc gaggtttctt ctcatcacca 720
gctcagctag gccgggcaga caaggacaga agactctggg ccactgtaat gtttgtgttt 780

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829

<210> 201

<211> 459

<212> DNA

<213> Homo sapiens

<400> 201

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<210> 202

<211> 388

<212> DNA

<213> Homo sapiens

<400> 202

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gccatggccc ccccgcccg cgtgccgtcc ccgatgtcac cgcgcgcgcc gctgctgctg 120
ctgctgctgc tgagtctggc gctgctgggc gcccgggccc gcgcgagcc cgcggggagt 180
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<210> 203

<211> 646

<212> DNA

<213> Homo sapiens

<400> 203

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tggacctgat cggttttggt tatgcagccc tcgtgacatt tgggaagcatt tttggatata 180
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<210> 204

<211> 618

<212> DNA

<213> Homo sapiens

<400> 204

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<210> 205

<211> 725

<212> DNA

<213> Homo sapiens

<400> 205

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<210> 206

<211> 835

<212> DNA

<213> Homo sapiens

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<210> 207

<211> 784

<212> DNA

<213> Homo sapiens

<400> 207

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<210> 208
 <211> 792
 <212> DNA
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<400> 208
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<210> 209
 <211> 373
 <212> DNA
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<210> 210
 <211> 827
 <212> DNA
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<400> 210
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<210> 211
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 <212> DNA
 <213> Homo sapiens

<400> 211
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tccagaatgt tttgtttttt aagaaaattg aattacttgt ttcctgaaat attctgaggt 540
taatatgtta gttttcatag aacattgaga ggccctgcc actttcaata aagacctgac 600
ttggtg                                           606

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<210> 212

<211> 588

<212> DNA

<213> Homo sapiens

<400> 212

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catgaagagg aaggagaaaa cgaaataact atagggtgcag agcccaagga gaccaccgag 60
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atccaggacc ctcagccccc gccttccgca ccagccatgg gggctgctga ccagctagca 180
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acccgacgct tagattaggg caacaagtac tgcaagaagg agctcagtta cggggttttt 480
aaaccttcat gaaaacctga agagttcact tttgttatta tgctcttaat gattttacaga 540
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<210> 213

<211> 894

<212> DNA

<213> Homo sapiens

<400> 213

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ggcgtgatgg ggtgagggcc cccctcccag cgctggaga tggggaggag tggaaataggc 180
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tgcttcaggg acatgagcac cgagcgcagg cgggacacat ctttgcaactg cttgctgtc 360
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ttggattcct tcacgaaagc ctctcggat gccacgtagc cgatgatac agcatctggc 480
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gcaggaccgt tggcctcctg aaacacatct ccattgactg tggccccat gtccctcagaa 780
ccagccccac tcgtggggcc cggctgcgag ggggcccgcg ggctgccggc aggtgccccg 840
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<210> 214

<211> 383

<212> DNA

<213> Homo sapiens

<400> 214

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ctgtaaggca gcaaggtagc gtggccggcg cccgagctgg ggttgtgtcc ctgctgggct 60
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agcgggacct ggaggcggag catgtggagg tggaggacac gacctcaac cgttgctcct 180
gtagcttccg agtctgtgtg gtgtcgcca agttcgagg gaaaccgctg cttcagagac 240
acaggctggt gaacgcgtgc ctacgagaag agctcccgc catccatgcc tttgaacaga 300
aaacctgac ccagaccag tgggcacgtg agcgacagaa atgagggact gggatctgca 360
cagccattaa attataaatc tgg                                           383

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<210> 215

<211> 644
 <212> DNA
 <213> Homo sapiens

<400> 215
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 tgtctgcacg gacgaaggag gcgaagacgc tgtccttccg gctgagcagc ttctctggct 180
 tategaactc aaggatggca ccccgcttca ggacgatcac caggctctga ctcaggatgg 240
 tgtgcactcg atgcgcgatg gtgaccacag tgcggtctgc gaaggctgtc atcaccacct 300
 tttggaggat gttttccgtg gccatgtcaa tggagccgt ggcctcgtcc atgatgaaga 360
 tgetggtctt cctcacgaag gcccgggcca ggcagaacag ctgcctctgt ccttggtgta 420
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 gcttcagctg ggcgatttcc agggcctccc acagtgtgct atctgagcac ttctctcag 540
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 atgcggaaga aggcaagaga gaaggaggac ttccactgc cggt 644

<210> 216
 <211> 892
 <212> DNA
 <213> Homo sapiens

<400> 216
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 tgatttgggg gagaaacaaa atctgcagat ggaatccgag caggggcact tcacctcaa 180
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 accctgcgag atggtgactc tgggcgcgga ggttggcgac tggcaaatcc gcagatcaca 360
 gaatgaaggc ggggagcgcg gccggcgccc ggcgggggct ttctcccca cccagcgcc 420
 cagggaagcg gctcaaccac ctgaatccgg aaaacgcca caagtagttt ctgctcgag 480
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<210> 217
 <211> 792
 <212> DNA
 <213> Homo sapiens

<400> 217
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 cagtgaacct gagttgcatg gctggggctc gaggccaggt cacgctggac ggagttccgg 120
 ccgcgccccc ggggcagcca gctcaacttc agctaaatgc taccgagagt gacgacggac 180
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 gcgtccagct gcgagtcctg tatggtccca aaattgaccg agccacatgc ccccgact 300
 tgaaatggaa agataaaaac agacacgtcc tgcagtgcga agccaggggc aaccggtacc 360
 ccgagctgcy gtgtttgaag gaaggctcca gccgggagggt gccggtgggg atcccgttct 420
 tcgtcaacgt aacacataat ggtacttata agtgccaagc gtccagctca cgaggcaaat 480
 acaccctggt cgtggtgatg gacattgagg ctgggagctc ccactttgtc cccgtcttcg 540
 tggcggtggt actgacctg ggcgtggtga ctatcgact ggccttaatg tacgtcttca 600
 gggagcacca acggagcggc agttaccatg ttagggagga gagcacctat ctgccctca 660
 cgtctatgca gccgacagaa gcaatggggg aagaaccgtc cagagctgag tgacgctggg 720
 atccgggata aaagttggcg ggggcttggc tgtgccctca gattccgcac caataaagcc 780
 ttcaaacctc ct 792

<210> 218
 <211> 520
 <212> DNA
 <213> Homo sapiens

<400> 218

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gcccaagatc tggccatcgc agctgctggt ggtcatcatg atctgctggt ccctcgtggt 60
gctcccactg cagttcgagg agctcgtcta cctctggatg gagcggcaga agtcaggggg 120
caactacagc cgccaccgtg cgagacgga gaagcacgtg gtcctgtgtg tcagctccct 180
caagatcgac cttctcatgg acttctgaa cgagttctac gccaccccc ggctccagga 240
ctattacgtg gtcatacctgt gcccacgga gatggatgtc cagggtgcga gagtctgca 300
gatccctctg tgggtccagc ggggtcatcta cctccagggc tctgactca aagaccagga 360
cctcatgcga gccaaagtgg acaatgggga ggctgtcttc atcctcagca gcaggaacga 420
ggtggaccgc acggctgcag accaccagac catcctgcgc gctggggcgc tgaaggactt 480
cgccccaac tgccccctct acgtccagat cctcaaacct 520

```

<210> 219

<211> 797

<212> DNA

<213> Homo sapiens

<400> 219

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ccgacccta ctggcgggcg caactccaca accagtacgg ccccatgaat atgaacatgg 60
gtatgaacat ggagcagcc ggggcccacc accaccacca ccaccaccac cccccgggtg 120
cctttttccg ctatatggcg cagcagtga tcaagcagga gctaactctg aagtggatcg 180
accccgagca actgagcaat cccaagaaga gctgcaacaa aactttcagc accatgcacg 240
agcttggtgac acacgtctcg gtggagcacg tggcgggccc ggagcagagc aaccacgtct 300
gcttctggga ggagtgtccg cgcgagggca agccttcaa ggccaaatac aaactgggtca 360
accacatccg cgtgcacaca ggcgagaaac ccttcccctg ccccttcccg ggctgtggca 420
aagtcttcgc gcgtccgag aacctcaaga tccacaaaag gacccacaca ggggagaagc 480
cgttccagtg tgagtttgag ggctgcgacc ggcgcttcgc caacagcagc gacaggaaga 540
agcacatgca cgtccacacc tccgataagc cctatctctg caagatgtgc gacaagtctt 600
acacgcaccc cagctcgctg cggaagcaca tgaagggtcca tgagtcctcc ccgaggggct 660
ctgaatcctc ccggcgccgc agctccggct atgagtcgtc cagcccccg gggctgggtg 720
ccccagcgc cgagccccag agcagctcca acctgtcccc agcgggcgcg gcagcggcgg 780
cgggcggtgc ggcggcg 797

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<210> 220

<211> 809

<212> DNA

<213> Homo sapiens

<400> 220

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gcgcgttttt tttttttttt tttttttttt tttttggttt ggtgttaggt gtgcctttta 60
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aattttatcc acattgactc tgatacatta cacttttggg cttatttcta ccatttcctt 180
ttgtgctatc tacttacctt tcactttctt tgcttttttg ctgtgttctg ttggattgac 240
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cagaggtact tatccctcc tgtgttgtgt tgtcttctc tcttttctt cttctacagc 480
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ggagatttta atgttccgc agcccgaggt gcgggagccc tcggacggac tccggccgcg 660
cccgagctcc ccagcgcgcg cgctgcggcc ccggctgacg acgagtcgag aaagtcactc 720
gcgatgaccg cggacgcgag gggcgggcgc cgtcgcgccg ccccgcgag gcgcgcgaaa 780
cttttcccg ttcgcaagtt gccgggctc 809

```

<210> 221

<211> 445

<212> DNA

<213> Homo sapiens

<400> 221

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tgaaaaatgc cgtcggtttc gaaagcgggc gcagcggcgc tgagcgggtc cccccgcag 60
acggagaagc cgaccacta caggtacctg aaggagttca ggacggagca gtgccccctg 120
ttttcacagc acaagtgcgc gcagcaccgg ccgttcacct gcttccactg gcacttctc 180
aaccagcggc gccgcaggcc cctccgcagg cgcgacggca ccttcaacta cagccccgac 240

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gtgtactgct ccaagtacaa cgaagccacc ggcggtgtgcc ccgacggcga cgagtgtccc 300
 tacctgcacc ggacgacggg ggacacagaa cgcaagtacc acctgcgtta ctacaaaaca 360
 ggaacctgca tccacgagac agacgcacgt ggccactgcg tgaagaatgg gctgcactgt 420
 gccttcgcgc acggccccct ggact 445

<210> 222

<211> 469

<212> DNA

<213> Homo sapiens

<400> 222

cagagcccg cccgacgccc ccatgagcgc cgcgctcttc agcctggacg gcccggcgcg 60
 cggcgcgccc tggcctgcgg agcctgcgcc cttctacgaa ccgggcccgg cgggcaagcc 120
 gggcgcgccc gccgagccag gggccctagg cgagccaggc gccgcccgc ccgcatgta 180
 cgacgacgag agcgccatcg acttcagcgc ctacatcgac tccatggccg ccgtgcccac 240
 cctggagctg tgccacgacg agctcttcgc cgacctcttc aacagcaatc acaaggcggg 300
 cggcgcgccc cccctggagc ttcttcccgc cggccccgcg cggcccttgg gcccggggcc 360
 tgcgctccc cgcctgctca agcgcgagcc cgactggggc gacggcgacg cggccggctc 420
 gctgttgcgc gcgcaggtgg ccgcgtgcgc acagaccgtg gtgagcttg 469

<210> 223

<211> 831

<212> DNA

<213> Homo sapiens

<400> 223

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 gccggacggg aggcggcccc gccgggggct cggccccggc cccagccccg ccagcatggc 120
 cggccggact gtacgggccc agaccgggag ccgggccaag gatgacatca agaaggatgat 180
 ggcgaccatc gagaaggctc ggagatggga gaagcgatgg gtgactgtgg gcgacacttc 240
 ccttcgtatc ttcaagtggg tgccagtggg ggatccccag gaggaggagc gaaggcgggc 300
 aggtggcggg gcagagagat cccgtggccg ggaacgtcgg ggcagggggc ccagtccccc 360
 aggggggtgg ctctcatcct gctggatctt aatgatgaga acaagcaacc agagtttcca 420
 ttcggaaggt tcctgcaaaa gggcacagag cccaatcctg ggggcacccc ccagcccaac 480
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 ggccaagaaa gagatcccg gggcatactt gttgcacgca ccgacgaacc cccaatgctg 600
 accaaggagg agcctgttcc agaactgctg gaagatgagg cccccgaagc ttacctgtgc 660
 tttagaccag tgccacctgt ccctgaggca gcccagggtg acacagagga ctcgagggtg 720
 gccccccac tcaagcgcat ctgcccgaat gccctgacc cctgaaaagc cggcctgcct 780
 gtccgtgtgc cccaggggcc cctttggctt tttaacaata aagacccttt t 831

<210> 224

<211> 401

<212> DNA

<213> Homo sapiens

<400> 224

ggagagagat ggtgtacgca tcgcgggagt cctcgccac gggcgccctc aacaacctgt 60
 caccagcgcc gcacctggca tccggctcgc cgcgcggcgg gctgccgtcg gggctgccgt 120
 ccgggctgca gtccggttcg ccgtcgcgtt cgcgcctatc gtacgcccgg gggcgcccgc 180
 ctctgtacgc cggcagcccg gtgcaccacg cggccgagag gctgggaggc gcccggcgcc 240
 cccaggcggt cagccccagc cccagcgcca tcctggagcg gcgacgctg aagccggacg 300
 aggacctggc gagcaaggcg ggcgccatgg tgctggtgaa aggcgagggc ctctatgctg 360
 accctacggt gctgctgcac gagggccgtc tgagcctggc c 401

<210> 225

<211> 735

<212> DNA

<213> Homo sapiens

<400> 225

gctgcaggag aatggctact catcacacgc tgtggatggg actggccctg ctgggggtgc 60
 tggcgacact gcaggcagca ccggaggccc aggtctcgt gcagcccaac ttccagcagg 120
 acaagtctct gggcgctggg ttcagcgcg gacctgcctc caactcgagc tggctccggg 180


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agaagaagcg gcgttggtcca tgtgcaagtc tgtgggtggcc ctgccacgga tgggtggcctc 240
aacctgactc caccttcctc agaaaacagt gtgagaccgc aacctatgtc tgcaccgcgc 300
gggtcctcgg tctacagct acggagtccc actggggcag cacctactcc gtgtcagtgg 360
tggagaccga ctacgaccag tacgcgctgc tgtacagcca gggcagcaag ggccctggcg 420
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agaaattccc gccttctgca agggccaggc cttcacagag gataccattg tcttcctgcc 540
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gccagccagg tgacccccac gctctggatg tctctgctct gttccttccc cgagccctcg 660
ccccggctcc ccgccaaagc acccctgccc actcgggctt catcctgcac aataaactcc 720
ggaagcaagt cagtt 735

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<210> 226

<211> 862

<212> DNA

<213> Homo sapiens

<400> 226

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gccgagtgcg agggacgagc ggagtaaaat ctccacaagc tgggaacaaa cctcgtccca 60
actcccaccc accggcgttt ctccagctcg atctggaggc tgcttcgcca gtgtgggacg 120
cagctgacgc ccgcttatta gctctcgtcg cgtcgccccg gctcagaagc tccgtggcgcg 180
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aaagtcagat gcccctttta aactccctct tcaaaactca tctcctgggt gactgagtta 300
atagagtggg tacaaccttg ctgaagatga agaataaca atattgagga tatttttttc 360
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ctgtttaaag atggttttgg aaattgaact tattacttca tgcataggtc tttgcaaatg 780
aattttttct tgacttttta ttatgaaaat ttcaaatgta ctgaaaaata gagatactat 840
gataaatacg tacatattca tc 862

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<210> 227

<211> 460

<212> DNA

<213> Homo sapiens

<400> 227

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gccgcacctg cgcctggcag gcggccggct ctgccagcc cctacccacg gccccggccc 60
cgcaccggga cacatggaag ctgccagccc ccagcccaag gatcagctga gccctagggc 120
tgatgcttgc ctacgttgct gagaatggca ctgaggccca gccaaacaaag gtttaaccag 180
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ctgtatgcca tccacggcta cttctgcgag gtgatgttca cagcggcctg ggagtctcgt 360
gtgaacttga actggaagtt ccctggggtc acgagcgtgt gggccctctt catctacggc 420
acctccatcc tcatcgtgga gcgcagtgtac ctgcggctgc 460

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<210> 228

<211> 892

<212> DNA

<213> Homo sapiens

<400> 228

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cttgtgcctc ttgggagacg tccaccggtt tccaagcctg ggccactggc atctctggag 60
tgtgtggggg tctgggaggc aggtcccgcg cccctgtcc ttcccacggc cactgcagtc 120
acccctgtct gcgcccgtgt gctgttgtct gccgtgagag cccaatcact gcctataccc 180
ctcatcacac gtcacaatgt ccgaattcc cagcctcacc accccttctc agtaatgacc 240
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cctttccctt gagaaggcct ggcccccttc tgtgctgagc ccacagcagc aggtcgggtg 540
tcttggttgt cagtgggtgg accaggatgg aagggaagg caccagggc agggccacag 600

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tcccgtgtgc ccccaacttgc accctagctt gtagctgcca acctcccaga cagcccagcc 660
 cgctgtcag ctccacatgc atagtatcag ccctccacac cggacaaagg ggaacacacc 720
 cccttgaaa tgggtctttt cccccagtc cagctggaag ccatgctgtc tgttctgctg 780
 gagcagctga acatatacat agatgttgcc ctgccctccc catctgcacc ctgttgagtt 840
 gtagttggat ttgtctgttt atgcttggat tcaccagagt gactatgata gt 892

<210> 229

<211> 421

<212> DNA

<213> Homo sapiens

<400> 229

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 actctgggggt atggcgttca atgtgtactc cacatctgtg accagtgaat atctgagtcg 180
 ccatgatatg cttgcatggg tcaacgactc cctgcacctc aactatacca agatagaaca 240
 gctttgttca ggggcagcct actgccagtt catggacatg ctcttccccg gctgtgtgca 300
 cttgaggaaa gtgaagttcc aggccaaact agagcatgaa tacatccaca acttcaaggt 360
 gctgcaagca gctttcaaga agatgggtgt tgacaaaatc attcctgtag agaaattagt 420
 g 421

<210> 230

<211> 605

<212> DNA

<213> Homo sapiens

<400> 230

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 cccgcccagc tagcgcagga agttcctggg gtagagctgg aagagctttc cctcctgtgt 120
 ggggtcgaag ccgtactttt ccaggttgtc aggggtcgaag gtaccgtcct tgaagtcctt 180
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 gatgcccttg gcgcccgggc ccttgcggcc cctgaagctg cgcggggccc gcttgctcgt 420
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<210> 231

<211> 649

<212> DNA

<213> Homo sapiens

<400> 231

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 ggggtgcacag tgacagtcac ggaagcggat gccatcacag tgggtgatgga gaacactgca 600
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<210> 232

<211> 339

<212> DNA

<213> Homo sapiens

<400> 232

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<210> 233

<211> 665

<212> DNA

<213> Homo sapiens

<400> 233

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 aagtc 665

<210> 234

<211> 355

<212> DNA

<213> Homo sapiens

<400> 234

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<210> 235

<211> 672

<212> DNA

<213> Homo sapiens

<400> 235

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<210> 236

<211> 769

<212> DNA

<213> Homo sapiens

<400> 236

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<210> 237

<211> 868

<212> DNA

<213> Homo sapiens

<400> 237

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gagaatcctg atatgaaaca agtcatgtag tctcatggcc gggaatctct ccacagatac 840
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<210> 238

<211> 525

<212> DNA

<213> Homo sapiens

<400> 238

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gggactactc ctctgcagcc gaattctttg tcacctgggc cgtgtttgac ttcctctact 480
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<210> 239

<211> 512

<212> DNA

<213> Homo sapiens

<400> 239

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gacctcttga tgtctccatg gtgacctcct tgggggtcac tgacctgct tgggggggc 480
 ccccttgtaa caataaaatc tatttaaact ct 512

<210> 240

<211> 500

<212> DNA

<213> Homo sapiens

<400> 240

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<210> 241

<211> 815

<212> DNA

<213> Homo sapiens

<400> 241

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<210> 242

<211> 881

<212> DNA

<213> Homo sapiens

<400> 242

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<210> 243

<211> 912

<212> DNA

<213> Homo sapiens

<400> 243

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<210> 244

<211> 564

<212> DNA

<213> Homo sapiens

<400> 244

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<210> 245

<211> 781

<212> DNA

<213> Homo sapiens

<400> 245

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c

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<210> 246

<211> 557

<212> DNA

<213> Homo sapiens

<400> 246
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<210> 247

<211> 526

<212> DNA

<213> Homo sapiens

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<210> 248

<211> 465

<212> DNA

<213> Homo sapiens

<400> 248
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<210> 249

<211> 577

<212> DNA

<213> Homo sapiens

<400> 249
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<210> 250

<211> 560

<212> DNA

<213> Homo sapiens

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<210> 251
 <211> 336
 <212> DNA
 <213> Homo sapiens

<400> 251
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 gctcttcggc accttttctt gtctcaggat cggaatgcgg ggtcgagagc tgatggggcg 180
 cattgggaaa accatgatgc agagtggcgg cacctttggc acattcatgg ccattgggat 240
 gggcatccga tgctaaccat ggttgccaac tacatctgtc ctttcccatc aatcccagcc 300
 catgtactaa taaaagaaag tctttgagta gtcaag 336

<210> 252
 <211> 678
 <212> DNA
 <213> Homo sapiens

<400> 252
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 tcagtttcat tgtcattttc aactcctgaa aactcctgcc agcaagcccc caccacgagc 180
 tgagtttcta tcttgatgg atggagcggg taatcctcag tcacagagaa gggctcgtgg 240
 gacgtgccat ccacatagag agtcacactc ggaatttcta cattgaggac gtatgggtgc 300
 cattcctcat cacagacctg attcaacttc cagtggaaact ctgcaggctc gtatttcttc 360
 tcctcagaag gatcctgacg gaagaggaag atcagccggc acccgtggac atagagggag 420
 tagtggtgcc gattcatatc tgttttatca gaactgcaaa gaattgtctc cttcttctctg 480
 ccgaatggcc catgtctcat ccacaccgag atggtgaacg gctctttggg gctgaccgac 540
 acgagcccat ccgggaccc cactgcctgg gtgccgttga actcaaacac ctggctcgtg 600
 tcgtggccat tgtcgggtgg caggcccatg gtccagttga gggatccact cggggatggc 660
 agcagctcgg cagtgcctc 678

<210> 253
 <211> 783
 <212> DNA
 <213> Homo sapiens

<400> 253
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 aaagaccccc aaacacttct attattttta ataaaaataa cctttaaaat tacagaagca 660
 aagcaactgg gtgtgggtggc ttatgcctgt aacccagca ctttgggagg ccaaggcagg 720
 cggattgctt gagctcaaga gtccgagacc agcctgggca acatggggac accctgtctc 780

tac

<210> 254
 <211> 489
 <212> DNA
 <213> Homo sapiens

<400> 254
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 ccgggcccggg cgggcaagcc gggccgcggg gccgagccag gggccctagg cgagccaggc 180
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 tccatggcgc cgtgcccac cctggagctg tgccacgacg agctcttcgc cgacctcttc 300
 aacagcaatc acaaggcggg cggcgcgggg cccctggagc ttcttcccg cggccccgcg 360
 cgcccttggt gcccgggccc tgccgctccc cgcctgctca agcgcgagcc cgactggggc 420
 gacggcgacg cgcccggtc gctgttgccc gcgcaggtgg ccgcgtgcgc acagaccgtg 480
 gtgagcttg 489

<210> 255
 <211> 586
 <212> DNA
 <213> Homo sapiens

<400> 255
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 ggaagcaagg gagcccagcc ggagccatgg ccagtagcgt ggtagcagtt ggactgacca 180
 ttgctgctgc aggatttgca ggcggttacg ttttgcaagc catgaagcat atggagcctc 240
 aagtaaaaca agtttttcaa agcctaccaa aatctgcctt cagtgggtggc tattatagag 300
 gtgggtttga acccaaatg acaaacggg aagcagcatt aatactaggt gtaagcccta 360
 ctgccaataa agggaaaata agagatgctc atcgacgaat tatgctttta aatcatcctg 420
 acaaaggagg atctccttat atagcagcca aaatcaatga agctaaagat ttactagaag 480
 gtcaagctaa aaaatgaagt aaatgtatga tgaattttaa gttcgtatta gtttatgtat 540
 atgagtacta agtttttata ataaaatgcc tcagagctac aatttc 586

<210> 256
 <211> 503
 <212> DNA
 <213> Homo sapiens

<400> 256
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 tcgccagcaa cctgaatctc aaacctggag agtgccttcg agtgcgaggc gaggtggctc 120
 ctgacgctaa gagcttcgtg ctgaacctgg gcaaagacag caacaacctg tgctgcact 180
 tcaacctcgc cttcaacgcc cagcgcgacg ccaacacccat cgtgtgcaac agcaaggacg 240
 gcggggcctg ggggaccgag cagcgggagg ctgtctttcc cttccagcct ggaagtgttg 300
 cagaggtgtg catcaccttc gaccaggcca acctgaccgt caagctgcca gatggatacg 360
 aattcaagtt ccccaaccgc ctcaacctgg aggccatcaa ctacatggca gctgacgggtg 420
 acttcaagat caaatgtgtg gcctttgact gaaatcagcc agcccatggc ccccaataaa 480
 ggcagctgoc tctgctccct ctg 503

<210> 257
 <211> 667
 <212> DNA
 <213> Homo sapiens

<400> 257
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 cctttgggtc atccttcag tatgggtaca acgtggctgc tgtcaactcc ccagcactgc 120
 tcatgcaaca attttacaat gagacttact atggtaggac cgttgaattc atggaagact 180
 tccccttgac gttgctgtgg tctgtaaccg tgtccatgtt tccatttga gggtttatcg 240
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 acaacatatt ttctatcgtg cctgcgatct taatgggatg cagcagagtc gccacatcat 360
 ttgagcttat cattatttcc agacttttgg tgggaatatg tgcaggtgta tcttccaacg 420

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tggtcccat gtacttaggg gagctggccc ctaaaaacct gcggggggct ctcggggtgg 480
tgccccagct cttcatcact gttggcatcc ttgtggccca gatctttggt cttcggaatc 540
tccttgcaaa cgtagatggc tggccgatcc tgctggggct gaccgggggc ccgcggcgct 600
gcagctccctt ctgctgccct tcttccccga gagccccagg tacctgctga ttcagaagaa 660
agacgaa 667

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<210> 258

<211> 551

<212> DNA

<213> Homo sapiens

<400> 258

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ctcgtggcag gacttgacaa gggcaagctt gaccaggaag ctgccatcag ggatcttccc 180
ctgccccgca aagctaggct ccagctgcag gcgggctccc accctctgct cctggccttg 240
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ccccaccatg gggtcctatg tctatttatt ctgccccagc tcacctcta cacagacact 360
gtcctgggtg cacactcttc ccttccctcg ctgtgtactt ccttgcccc tttttattta 420
ttgggcaggg ggagggggag ggacacaggca agaagagatt cacagtgtcc tggggtaagg 480
gggggttcac agtaatcatg gtctactcct ctttccgtgg ctgggggtag aattaataaa 540
gagagaaaaa c 551

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<210> 259

<211> 791

<212> DNA

<213> Homo sapiens

<400> 259

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agctgccagg ccaacaactt ctctctgtg ccgctgtccc tgccaccag cactcagcga 180
ctcttctgca agaacaacct catccgcacg ctgcggccag gcaccttttg gtccaacctg 240
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ttgcaagccc tggaggagct ggacctcggt gacaaccggc acctgcgctc gctggagccc 360
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gcgctcgccg acctgccctc gctcgagttc ctgcggtcca acgctaacc ctggggcgtg 780
gactgcccgc c 791

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<210> 260

<211> 431

<212> DNA

<213> Homo sapiens

<400> 260

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atgttggggg gctgggaggg cagtgtactt tcatttctg cgtcctgctc agtggcctgg 180
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ccccgtgctc tgctgtgctt tcccgcggcg cccctcacc gccgcggacc cacagctccg 300
gaaagggcca ccagtccctc cgcctcccaa acacaccccg tccaaggaag tcaagcagga 360
gcagatcctc agcctgtttg aggacacgtt tgtccctgag atcagcgtga ccacccctc 420
ccaggtcagc c 431

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<210> 261

<211> 467

<212> DNA

<213> Homo sapiens

<400> 261
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 ttctcacact gctataaata aacacctgag actgggtaat ttataaagaa aagaggtttt 120
 gttgtctcac tgttccacaa gctgtacagg aaatgtgatg ctggcgctcg cttggcttcc 180
 ggggggggtgc ctccgggaaac ttaccatcat ggcagaaggc agagggggag ccggcacttc 240
 acatggctgg cgggtgggtgt gggggcggtt ggggggggctt gccgcacact ttttaagtga 300
 cggatctcat gagaccaaca ccaagaggga gctctgcccc cctgatcccc tcacctcccc 360
 ccaggcccca ccgcccgcgt tggggatgac aattcaacat ggggcctggg tggagaccgg 420
 gatccgggag gagacacnga tccaaatttt gcatttttcc cctaatt 467

<210> 262

<211> 250

<212> DNA

<213> Homo sapiens

<400> 262
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 ccacctgtgc tgctgcacca acctcactgc cctccctcgg cccacccac cctctggtcc 180
 ttctgacccc acttatgctg ctgtgaattt tttttttaa tgattccaaa taaaacttga 240
 gccactcct 250

<210> 263

<211> 508

<212> DNA

<213> Homo sapiens

<400> 263
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 tctcaagatg cgcctccacc tgctcctgct gctcgcgctg tgcgggtgcag gcaccaccgc 120
 cgcggagctc agttacagct tgctgggcaa ctggagcatc tgcaatggga acggctcgct 180
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 atctcctgag ctccaggcaat ccgcccacct cggcctgtca aagtgtggg attacagggtg 420
 tgagccacca tgggtggcct ctttaataata gatttataag gccctttgt tatatatttt 480
 caaaaattca aattaaaact aaatcccc 508

<210> 264

<211> 489

<212> DNA

<213> Homo sapiens

<400> 264
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 ccacatcttg gttttctgtg tgggtctcct caccatggcc aaggcagaaa gtccaaagga 120
 acacgaccgg ttcaacttacy actaccagtc cctgcagatc ggaggcctcg tcatcgccgg 180
 gatcctcttc atcctgggca tctcatcgt gctgagcaga agatgcoggt gcaagttaa 240
 ccagcagcag aggaactggg aacccgatga agaggaggga actttccgca gctccatccg 300
 ccgtctgtcc accgcaggc ggtagaaaca cctggagcga tggaaatccgg ccaggactcc 360
 cctggcacct gacatctccc acgctccacc tgcgcgccca ccgccccctc cgccgcccc 420
 tccccagccc tgcccccgca gactccccct gccgccaaga cttccaatta aacgtgcgtt 480
 cctctcgac 489

<210> 265

<211> 684

<212> DNA

<213> Homo sapiens

<400> 265
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 cctgcgcaa gctgcctgc acccctctc tgatccgagc tggatccaga gttgcataca 180
 gaccaatttc tgcatacgtg ttatctcgac cagaggctag taggactgga gagggctcta 240

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cggtatttaa tggggccag aatggtgtgt ctcagcta ccaaaggag tttcagacca 300
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aacaattac tgcttgacat gttggcattc atattaatta cggatgtaat tctgtgtatc 600
ttactgtgac tccgaaaact gtagtattgg tgtcatggga atgtacgtta tttccaaagt 660
catttcatta aagatgaaaa cttt

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<210> 266

<211> 548

<212> DNA

<213> Homo sapiens

<400> 266

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cttgtcctga gcgcggagag ggcgagctcg ggccgcgggc agggcgggag ccggcagccg 60
gcaaccaagg gaggcagaaa ggcacaaaga tcgcaataat atccgttata acccgctatc 120
taacccccacc cccaacacac acccatccat cccaccctcc gggagaggca gccggcgatc 180
cgctctctgc gccctgggaa aaagccccag ccatgagcaa tcagtaccag gagggaggct 240
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gcccgggcgg gggcgcgctc cttcaggggt cggcagcggc ggcggcggcg gcggcggcgg 540
cggcggca

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<210> 267

<211> 736

<212> DNA

<213> Homo sapiens

<400> 267

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ccgggacctg agggacttgt cgggcctcaa tgatctgctc aacgtgctgc agagcctgct 120
gctcccgctc gccgtgctgc ccatcctcac gttcaccagc atgcccaccc tcatgcagga 180
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tcctagcgca gcaatgtgat taccctctgg gtctcagtg cctcatctgt aaaatggaga 660
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aaacaaacaa acaaac

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<210> 268

<211> 418

<212> DNA

<213> Homo sapiens

<400> 268

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gtccggcgct gatccggatg cccgaggcag aaggatgttt gacctccgga taagcagggc 120
gctgctgtgc attcattccg ggctgcacag gtggcgacag cagaggctcg ggcggcgact 180
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ccctgcgtgg ctgcttttcc tccctcggcc gccggcgggt gtgatgtgcc gccgcgctg 360
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<210> 269

<211> 409

<212> DNA

<213> Homo sapiens

<400> 269
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 tgctgttgga ctctggactg tttccctct cagcatcgct tttgctgggc cgtgatcgtc 300
 cccctttgtg ggctggaaaa gcaggtgagg gtgggctggg ctgaggccat tgccgccact 360
 atctgtgtaa taaaatccgt gagcacgagg tgggacgtgc tgggtgtgcg 409

<210> 270

<211> 598

<212> DNA

<213> Homo sapiens

<400> 270
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 ttccaggcgt gagtccctga gataaaaatg gattttaacc taggactgcc gggagctggc 180
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 tccccttcca gtccatccac ttcatcacct atgagttctg caggagcagg tcaaccccca 540
 ccggacacac aacccgcagt cccacatcat ctcaggcggg ctggccgggg ccctcgcc 598

<210> 271

<211> 430

<212> DNA

<213> Homo sapiens

<400> 271
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 aagtatttgg 430

<210> 272

<211> 456

<212> DNA

<213> Homo sapiens

<400> 272
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 ctgcaagaga aaagaagttt tatctcccca agtctctctg tcttccctt gagctcacca 120
 atttctcctc ttcaaacagc ttcttggttt caggggatgc atatacagcc agtccttgag 180
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 cctccaccag cttatagacg cgatgtcgcc ggtgcaggcg cggcttccgg ccctccccgg 360
 ccagcggtag cttccaccag cgctccacga tgaccgtgcc ccgattttga gaaaggctga 420
 agttgcaggc caggtcaggg gcgttccctt catgtc 456

<210> 273

<211> 500

<212> DNA

<213> Homo sapiens

<400> 273
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 gatgaaacaa tttgatttgc ctaaggacac aacttataaa ttcaaagtct tcaaaccgtg 180

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gcatttgtct ctcaataaaa ggaagcattt gctgggtgcg gtgggtcacg cctgtaatcc 240
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gccagcatgg tgaaaacctt atctctgctg gaaaatgcaa aaattagctg ggcattggtg 360
gcacacactg tgggtccagc tgctcgggag gctgaggcac agaatacgctt gaacctcgga 420
gggtggagttt gcggtgagcc gagattgcac cactgcactc cagcctgggtg acagagtggag 480
ccctgtctca aagaaaaaag                                     500

```

<210> 274

<211> 762

<212> DNA

<213> Homo sapiens

<400> 274

```

ggaaaaacac gccagaaata tccttttggg tggtgcttgg aagaccgacc ctgagggagg 60
tcagctcatg gggactgagg tcagggccag gctgccttgc tcagctccag gaaggggcaa 120
ccctgcacag gccaggtccc tgcagcttct gatgacggca gcttctcaga gagggctggc 180
tgcagagacc acagaccttc aggggtggcag acacaaaaaa ggctgtggag cccaggcctt 240
tcaacttgcc aaagatcctg ctcccttctc taaggactta agcactcctt tttttctttt 300
tccaaaagggt gtcttgccgt gttgcccagg ctggagtgcg atggcgtgat catagctcac 360
tgcagcctca aactcctggg ttacgcgaat cctctcgtct cagcctcccg agtagctggg 420
actacaggtg tgcaccacta tgcttggtta atttatttta tgatttttag agatggggta 480
ttgctcattg cccaagctgg cctcaagcaa tcctccctcc tctgtaacct caaagtctg 540
gaattacagg ggagagccac tgcacctggc cgactcaagc tttgtagaac ctcatagtca 600
cttgaaagtt actttccttt gagagacctc ctgggggtca ggagggatct tcacctatat 660
tcaaagccct ccagtcctt tctttgcctt tacaggaaca cagggcccac tcccctgggg 720
gttgcataat caatagttat ctcccttctt gagcatgaaa gc                                     762

```

<210> 275

<211> 724

<212> DNA

<213> Homo sapiens

<400> 275

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cgaaggggtg acttgggtgt gaaggatggg ccttggtttt ctgcaggtgt ctaccccggtg 60
gtggggccacg cccactgtgc cccagctccc ccagcccata gtactgagca cagccggggag 120
gcatgggagg ggctggagtc cccttgggtc ccctggagga ggtgggcctg ggcaggttcc 180
tggcagaggg accgcacagg ctctcagggc aagtgggtcaa gcagccctgg ccgcggtgg 240
tctactggta cagcctctgg gccacagcct gattgtgagg gtgctgggga gccaaaggagg 300
gctctgggaa gtaggcatcc tgcttagact cgcacgggga agagcaggcc gtggcttcag 360
ggatgcagga ctggagatgc tgctgactag gggtcagggt gtccgtctct gagggcctga 420
tgggggggtg gactgacagc aaagttcacc caccctgtgg cagggcccgt ggctccctgt 480
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aggcagtcag cttggggcgt gatggagtga agttggaacg tgccctgggg tgggggaggc 600
gttgcccagc ctggctggca gattcctctc agcccgggac aaggggcggg cctgtctcct 660
tcacaagccg gcggaaaccg gggctggaaa cccagacccc gccacttccc tcagaggcgc 720
agcc                                     724

```

<210> 276

<211> 509

<212> DNA

<213> Homo sapiens

<400> 276

```

gtcgccatgg cctcgtcgc ccaggagagc gcgggctcgc agcgccggct accgccgct 60
cacggggcgc tgcgggggt gctactgtc tgctgtggc tgccaagcgg ccgtgcggcc 120
ttgccgcccg cggcgccgct gtccgaactg cagcgccagc tgcggggcgt ggagcagctg 180
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ctgcgcgcgg gcggcgggcc ccatgaggac tgcccgggcc ggggcagcgg cggctacagc 300
gcaatgcctg acgccatcat ccgcaccaag gactccctgg cggcggtgct ctgcttctgc 360
gggcccgggc gcccggtgcg cgctggcggc nngtgcgtgg cggcctgctg ctccgcgncg 420
cgctgctccg tggcgtgggt gagcgtgccc cgcgcgcccc gcgccccan nagccgtgct 480
cggctgctac ctcttcacct gcacggcgc                                     509

```

<210> 277

<211> 786

<212> DNA
<213> Homo sapiens

<400> 277
gcagaactta ccctcttgcc caagagaata ggagtgtctat tttttgggtg cagagagtga 60
gggtagtggg tagaggtctg aaagtgtaga cagagtttgc cataagagca gcgttagatt 120
ttgtccaggt ttatctcatt tttctctgtt ggagaccaag atgcttgacg tgaagtgtgt 180
atltgtgtaa tgtgtatttg ttcatattcag ttttttataa cttcaacta tgccatcaac 240
ctaatacaatt ttaattttga ttgcatatca atagcaacca taaatttttt caacccccaa 300
atltatgtag ctctgatttg tagaatattg ttttttgacg acctttcaca tatgtgcttt 360
atgttgattc tctctaattc tgtaagtttc tggagaaaact gaggttaggc acacagtgtg 420
ttacacttgg taaatgccag acccaggatg tgaacctaga tagttcaact ccagtgcctg 480
gatgtctgag ttaagagtaa taaagggtggc cgggtgtctg ggctgatgcc tgcaatcccc 540
cagcactttg ggaagctgag gcgggcagat cgtgaggtcg gagttcgaga ccagcctggc 600
caacatagtg aaaccagtc tctactaaaa atacaaaaat tagcctggca tgatggcgca 660
tgctgtagt ccagctact tgggaggctg aggcaggaga attgcttgaa ccagggaggc 720
ggagggttga gtgagccgag atccaccact cgtactccag cttgggcgac agagcaagct 780
cgtccc

<210> 278
<211> 512
<212> DNA
<213> Homo sapiens

<400> 278
ggcccgagc gcgggagccg gaggcggaga cgtgggttggc ggggactgtg cgccttggga 60
ggggtcggag tcggcggggg cggagcctca gcgtccctg tcgcctgcgg actccatggc 120
ccttcttgga ctggcccttg cccaactccc agccaccacc actgtcccta ccactgagcc 180
cttgacacag ccacttgctc agacgagaca ccctaactct tgctcactcc ctaaagccct 240
cttcaggggt cactcctccc aagaagccct ccttgccacc ccccgccggc agggggccct 300
cctctgtgct ccctcggta cctgtgctac ctctaaccac aactgacca cactgtatcg 360
tgagtgtccg ttgacgtgac caattgccct gccaggctgt cagcgctca agggtaggg 420
ctgcgtgtga tttgtctctg agccccctgt gccacccag gggccggcac agagtcatg 480
ctcaataaat gtgtgttgac tgcaaaaaaa ag 512

<210> 279
<211> 773
<212> DNA
<213> Homo sapiens

<400> 279
gtgcgatctc gggtcactgt aacctcaact tcttggtttc agatgatcct cctgcctcag 60
cctcctgagt agctgggact acaggaccga gtctcctgcc attccgagca ggctgggtat 120
gggtaatggg gtgaaggag gcccggtgcg attgcatgag gatgctgagg ctgtcctgtc 180
ctcgtccgtc tcatcaaagc gtgaccacag gcaagtgtc agctccctgc tgtctggggc 240
cctggctggt gcccttgcca aaacagcggg agctcccctg gaccgaacca aaatcatctt 300
ccaaagtgtc tcaaaaagat tttctgcca ggaggccttc cgggtcctct actacaccta 360
cctcaacgag ggattttctc gcttggtggc cgggaactcg gccaccatgg tgcgctgggt 420
gccctacgcc gccatccagt tcagcgaca cgaggagtac aagcgcatcc tgggcagcta 480
ctatggcttc cgtggagaag cctgcccc ttggcctcgc ctcttcgccc gcgactggc 540
tggaacgaca gncgcttcac tgacctacc cctggacctg gtcagagcgc ggatggcctg 600
aaccgccgaag gaaatgtaca gcaacatctt tcatgtcttc atccgcatct cgagagaaga 660
ggggtgaag actctctacc atggatttat gccaccctg ctgggggtca ttccctacgc 720
tggcctgagc ttcttcacct atgagacgct caagagcttg cacagagagt aca 773

<210> 280
<211> 805
<212> DNA
<213> Homo sapiens

<400> 280
tgaatttgta cactgaaaga aaatttaaata aaaggggaag tccacattaa aaagaaaaca 60
aaacaaaccc taactaactt ccaaatgggt ctccctgggtc gggggcgtga gtggcctg 120
cctgggtgtg ctgcctgtct gagcaagctt ccctagctgt ggaaccccg gccccctgct 180

```

gcgggctctg ccttggtgtc atgcctgctg ccccccggt tccactgacg tgccgtctgt 240
ggctatgggg gtggtcactg gaatgacggt cactccagac gtcagccggc agggatgcag 300
caggctggcc ggcacccggg gctcgggcac cctctggccc cactctggca atgatgccac 360
accttgccat gtccacgctg ttggtcaaac cctctgtca tgccttttta aagagaaaag 420
aagagaaaga tttttttttt tttaatggca gaccgaagtg gagatcttgt agcctagata 480
ggatagtctg acctcttagc atagtctttt tggcaaatga tttgtgtttt cagtgtgtgg 540
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ggcttccctg agctggatgt tgtgggtgtt gccgtgcttc aggaagtgtg gcgaccagaa 660
agcgtagacc cggggcccag ggtctgccc cccctgcagc ctggcctccc cgcacaggct 720
gtggcttgca ctccagccgc tctagtctct caggaatttg cttgttactt gtactgtgta 780
aataaagctt cctggttcaa taccc 805

```

<210> 281

<211> 872

<212> DNA

<213> Homo sapiens

<400> 281

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ctgggatgtt atacattctg ggaactggac aggagtggct gcttgggtgg gctctggcac 60
cctgggatgt tatacattct ggaactgca atcagccact agagaagtgc gagctacagg 120
aagtgaccct ggggtgggac ctggggacat ggccagggtc gcatggggac acccggtccc 180
agcaggagct ctggtctgtc ctggggctct tgggggcagg gctgcggccc tgggcaggct 240
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atgtagcatc tgattcgtca tctctcatga aggcgatttg gttcataact ctgaaactct 360
gaaaaaggtc aaaagaagca gagaggccct cgggtgatat gccagctttt ctgccggtgc 420
tttctccac tactctgggt ggtctgctct cctcttcaaa cctcagctcg cagggagggc 480
ctgaatctgc cagccctca ggatctcctt cctctgggc cctccccagc cttaaggagc 540
ctcccagaca gaagggtgga cagagccacc tgggcagccc gagagacaca cgggggtcct 600
ccctgtggac agccctgcca gcttcggccc agccctgagc ttcatttgca tcttgaggag 660
taaggggtgg tgaatggga atgctggtct ggtcagctg gtcgtgggca taagtgcggc 720
ctgaatggat ggcattctct cctcctgtct tatgttctgg ggtccagggt cttcccaggc 780
ccatgcccct gctgctaatt cttgccctaa cccttaccct aaccagcgtc cagcgtcgtc 840
tcaccgagcc gtaaataaat caacagattc ac 872

```

<210> 282

<211> 486

<212> DNA

<213> Homo sapiens

<400> 282

```

tttaatactt ttttttttaa tgtggggaag gagcttgctc tgacgtcacc ctccctctccc 60
ctgactcctg tcctgagagc tgtggatgcc gcctcctgcc ctgcctaccc ctgaaacgtg 120
gggaatgggg gcccaggac agcatcagga cttttgagtc cagctgccag caatgggtcc 180
aactcggagg cagcgctctt tggtecccat tctgtatag caggcgtgtg tgtgtgtgtc 240
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tgagggcgct cctcctcttc agccgggcag cctggcctct cctgcccaga cctgcggtcc 360
cagcatcccc cagagccagg gaacaggccc agcgggaggg ggttttatgt tttgtttcaa 420
acagaaaaca caaccttatt tttctttaca aaagcaaaaa aggaaaccaa aaaagatata 480
gccttc 486

```

<210> 283

<211> 515

<212> DNA

<213> Homo sapiens

<400> 283

```

tggaattat ataaaactga aatgtaatgt ctaatgataa agtttgcagt aaacatggcc 60
atgctcattc atgtatatat tgcctatggc ttcttttgca ttataatggt agtgttgagt 120
agttgtaaca gaaactgtct ggcccacaaa gcctgcaata cttaccatct gacccttcac 180
agagtaagtt ctctggccca tactatggag ggtcaagaat agaaacagtg gggccaggcg 240
cagtggctca cgcctgtagt cccagcactt tgggacgccc aggcaggcag atcacctgag 300
gtcaggagtt caagaccagg ctggtcaaca tggcgaaacc ccgtctctac taaaaatata 360
aaataattag ccagggtgtg tgactcatgg ctgtagtccc agcttcttgg gaagctgaga 420
cacaagaatc acttgaactc aggaggagga ggttgacgtg agccaacatc gtgcgctgc 480

```


actccagcct gggtagacaga gtgagactcc atctc

515

<210> 284

<211> 629

<212> DNA

<213> Homo sapiens

<400> 284

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ctcatgggtg gttcagggga ctccagccctg aggtgaaagg gagctatcag gaacagctat 60
gggagcccca gggctctccc tacctcaggc aggaaggcca ggaaggagag cctgctgcat 120
ggggtggggg agggctgact agaaggcca gtcctgcctg gccaggcaga tctgtgcccc 180
atgcctgtcc agcctgggca gccaggctgc caaggccaga gtggcctggc caggagctct 240
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caccgcgggg ctctctgctg tacatatttg agactagttt ttattccttg tgaagatgat 360
atactatttt tgttaagcgt gtctgtattt atgtgtgagg agctgctggc ttgcagtgcg 420
cgtgcacgtg gagagctggg gcccgagat tggnacggcc tgatgctccc gcccctggcc 480
cggggtccag gggaagctgg ccgagggtcc tgggctcctg agggcatctg ccccccccc 540
aaccnccncc ccncaactgt tccagctctt tgaaatagtc tgtgtgaagg tganagtgc 600
gttcagtaat aaactgtgtt tactcagtg 629

```

<210> 285

<211> 409

<212> DNA

<213> Homo sapiens

<400> 285

```

ctgcgcgcgc ctgcgcgcgc ggtgaccttt ccgagttggc tgcagatttg tgggtgcgttc 60
tgagccgtct gtccctgcgc aagatgcttc aaagtattat taaaaacata tggatcccca 120
tgaagcccta ctacacccaa gtttaccagg agatttggat aggaatgggg ctgatgggct 180
tcacgtgtta taaaatccgg gctgctgata aaagaagtaa ggctttgaaa gcttcagcgc 240
ctgctcctgg tcatcactaa ccagatttac ttggagtaca tgtgaaagaa aacgtcagtc 300
tgctgtgaaa tttcagcaag ccgtgttaga tggggagcgt ggaacgtcac tgtacacttg 360
tataagtacc gtttacttca tggcatgaat aaatggatct gtgagatgc 409

```

<210> 286

<211> 380

<212> DNA

<213> Homo sapiens

<400> 286

```

ccccatcacc cgagaggaga ggaagcccca actaaccccc gctggccctc gggcctcccg 60
agtggccggc tgcaaccacg gctcctctcc agggtagggc agcttgagga atcttattta 120
ttttatttat ttaccctaat ttgaactagt ctgttgggtt gggggaagga ggtggctgct 180
acccccaagc cttccagtg ctgacaaccc cgggggcagg cgagggcgcc cagtcctca 240
ccatcggctg cacatcgccg cctcggggcc tgccatgtcc ctggtgctac tgacctctca 300
aggcttcctc caatctgggg tcgggggacc ctgggaggtg ctttacagac cgctaataaa 360
agacgatctg cgtgaacgcc 380

```

<210> 287

<211> 690

<212> DNA

<213> Homo sapiens

<400> 287

```

ctttttctaa gttggtagac ctaaaaaatg ttttcaaaaa tatatctagc tgcattttcta 60
ctgctgtcat tccttaagc tcttctctca aaaactccat atgaatgaat acatttacca 120
actcagtgat tactaaataa tagtacttta tacttatata cagtaatacc ttctatctaa 180
ggatctcaaa tgccaatata ttagtcatca ccctgtaagg tggatgacat attattccca 240
ttattccaat gggaaaattg ggccatagaa aactgaggag caaatgactc atctacagga 300
attaaatgga aaaaacaggc taggatttct cagcacactt taggagtga tgaaaactta 360
caggcttcag ttctactgct ggccaccatt ggatttgtaa gatccaggat gtgtattgac 420
cacatgtgtc cagaccagg cttagggcat ctggaatgag agtgggtggc tgggtgtgtg 480
gtctgaggat ctggatggga gactgcattt tcttctctgt gcaaaatatg gaagtgtgac 540
cttgaagggt ggcttagtct atggccttcc ccactcctgc ttgaaactgaa gctggagaga 600

```

atgggcattt ttaaatgtta cggcataatgc taatataata ttatggcatt aaataaaaaac 660
aagaagagaa ctgactaaaa ccaaaaaacc 690

<210> 288
<211> 400
<212> DNA
<213> Homo sapiens

<400> 288
agaaactgta gcatatocag cccoctaaaa tgtacaatgt aacttgttca gtccaacaaa 60
aacagggttcc ttatgtttct gccttctcca ccagggtcgc tccatcacc aaacaaaaga 120
acaagggttg ccaggatgtc cgagtgcgcc ctggccctgg ctctcgtgtg catggacgtg 180
cctgaggggt ccgggcacgg ccatacgcag gaccctgtg ccgggggagg cgtgcagg 240
attcccatc cgtcgtctt ggggccagcc cgtcttatgg actctgcctt gctttgctta 300
tgtttagctg tttctctgct acctttcgag cagacttctt tactacactg cactggattg 360
ctatattttt aaccagaaat aaactaaaga ttagagcatg 400

<210> 289
<211> 490
<212> DNA
<213> Homo sapiens

<400> 289
gccctgcccc ccagcactgg cagcacgctg ggcctcccc acacaggaca cctgcagtt 60
ccgggggaag ctgactcaaa tcaaccttga aatctcatga aaacaaaatg acttgtctt 120
ttatttgata gtgtaatatc attcatttta taaatttttt agggtttttc tcgtaatat 180
gtacagtttt gcatggcctg gtgtgatcat ttttgggtta gaataaatg ctgacaaatg 240
tggtatggagg ggaagatact gctttagcct atcactcctt attttatttt gtttggttt 300
atgccctcag tgtcttaggg aacttttta gagatcctct gctaccaaac aatgatgtg 360
attcttttgc acagaaatat ttaaggtggg atggtaaaa atgtcacaaa agactcctca 420
ccaatacttt atgttgatat cacttaatat taaccagact ttgctgtatt gcaataaaac 480
agagaactgt 490

<210> 290
<211> 497
<212> DNA
<213> Homo sapiens

<400> 290
ctggggggcc cagtgtgaag gggaagcctg ggaagaggct ctacagctcct cgaggccct 60
tcccgcggct ggctgactgc gccatttcc actacgagaa cgttgacttt gccacattc 120
agctcctgct gtctccagac cgtgaaggcc ccagcctctc tggagagaaat gagctgggtg 180
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cggagcttcc cccgcccccc gaggtgcca gggctgcca gatgctggtg cactgctgc 360
tgcatgacct ggagacactg tcaggactgg tggacagtaa cctcaactgc gggcctgtgc 420
tcacctggat ggagctggac aatcacggcc ggcgactgct cctcagttag gaggcgtcac 480
tcaatatccc tgcagtg 497

<210> 291
<211> 713
<212> DNA
<213> Homo sapiens

<400> 291
gcagcttcag gtgagccaag gggctctgct ctgtggcggt gcagtggcaa aggatccaga 60
tagcctaggg tgagggtgac agagggacag tgggctatgc cactaggccc tggcttggct 120
ttggaagac ctgtgagggg aaaccttcac ccagcaccca tgcccactc tgctgaggcc 180
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cacagtccag gcggggctgg ccagctgtgc gagaacacaa gccacgcctg cgtatggtgct 300
gcaccctggt tgcctctgcc tggcctcct ctggtcactt caaacatgcc ctgaggcttg 360
gggatgccct tcttccattc ccagacagca gtgtgagggt gcagggacca agatgtcaag 420
ctggccgtgg agtcgagttg gccgacggac cctttcacc tggttatgag ccgacttctt 480
tggggttctg cctctggcct gggaaaaggg caggagccta gaggaggaaa aaggctggtg 540

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gacagaccca ggggtggtctt caagcctggc ccagtgaagag tgaggccccc gcacgcaagc 600
ctcagccact cccagggggcc tttgcagcgt ctttttaacc tcagaaaatt tctcaatcta 660
tgtgatttgt gtaatactaa tgagctttgg gcaataaata cgggatttaa agc 713

```

```

<210> 292
<211> 510
<212> DNA
<213> Homo sapiens

```

```

<400> 292
ggatgaactg cgtctggact cttagattca taaaatatte gagggtttgg gagtccacaga 60
ccctcccctc tcctcagtgc acttttagcat ttgcacgggtg tcttccccgg acagcacagc 120
aataaatggt gtgattgcgt ggacaccgtg gctctgttct tggccaagtt tccccacctt 180
ctgcccagga ctccactgct aattcggggc catcttcttc cccaaggaag acaaatctct 240
tttctagcgc tgcagcaggg aggtgggggtg ggcggtaaag agacaggctc tggcagtgca 300
gatctgctga tcctcagcgc ctgccaggag ccagactctt ggcggagcag tgccacttct 360
gctgggctga cctgcagcgg agagtctgcc caccgccgag acaccatgag ggaatggacc 420
acgtgggagc atctgtgtgc aagtctcatt tgggtgtgtt tatgctgcgt gttgtatgcc 480
tgttttagtc ataaagtagg cctgatatct 510

```

```

<210> 293
<211> 559
<212> DNA
<213> Homo sapiens

```

```

<400> 293
ggggcgccca gcctggacac acgttagaac tggctgggga gggctctgtg gggaggccgg 60
actcagggct caccctggag aggaggacaa aggtgtctga atctggactg aatccgacct 120
ctagccctgg gctgggcgtg gggagtgtg gccaacgtgc caggcaggga ggacctgaat 180
tcctgaagggt ggtggtggca gctgttaggg tcacacaggtt aatgatctcc aacgtcacac 240
agaagagaat gtgtgaggt gtgacctccc tcacctgcc ttggctgcgt ggggcaccgt 300
ctctccagga ctaccctgc cccccaatag actgaagtct gaagatcagc ccagtcttcc 360
ttcaggcctc aatgccctct cacttcccca gcccaggga ctctggctc ttctcggagg 420
ctgctctgtg ggtccctcc cttgggcctt tgctaagtct gtgccctctg cctgtgccag 480
aggtgggcct gggcccgttt ctccaggagc tcctgaacac caagaaattg aattgctttg 540
taaataaaca aaaagtgcc 559

```

```

<210> 294
<211> 444
<212> DNA
<213> Homo sapiens

```

```

<400> 294
ctccgtgcc aatgttcgt cctgacgcgc ctgtgtgtgc ggggcttgac aggctcggcc 60
cgggcgctcc cagtgcgcgc cgccaagatc cattcgttgc cgccggaggg gaagcttggg 120
atcatggaat tggcgtttgg gcttacctcc tgcttcgtga ccttccctcc gccagcgggc 180
tggatcctgt cagacctgga gacctacagg aggcagagt gaagggtcc gttctgtccc 240
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cggcctcccc tggatcatgt cattcaattc cagtcacctc ttctgcaatc atgacctctt 360
gatgtctoca tggtagacct cttgggggtc actgacctg cttggtgggg tcccccttgt 420
aacaataaaa tctatttaaa cttg 444

```

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<210> 295
<211> 889
<212> DNA
<213> Homo sapiens

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<400> 295
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tgctgaaatt aatcaacgat tcttgaagtt gaagaaaagg aggttccagc cttggcaaga 120
ggagtgtggc ccttccctga atccctctgg acacaccctc ctacatcct ctaggaaaga 180
tgcggcagct caaagggaag cccaagaagg agacctcaa ggacaagaag gacgggaagc 240
aagccatgca ggaggcccg cagcagatca ctacagtgg actgccacg ctggccgtgg 300
tcgtgtctct gatcgtggtg tttgtgtacg tggccacgcg cccaccatc accgagttag 360

```

```

ccccgcagcc ggccgcggac cccatcggca gggagaggag gcgcgggagg gggacgcaaa 420
caaaaaatgg ctttcatatt cagagatgtt catgttgcg agctgtaagc aggagcacc 480
tgtcttctct ggtctttgac ttgattaaag tatctccgct ttcttgggag ggaatagggg 540
atgtttttatc agtgaatgtg ccatacacct tatgggccac ttcatgtgcc ctttcagact 600
tcaaaagcgc cgcgcatgtg tgtgtgtgtg tgtgtgtgtg tgtgtgtctc tttttctctc 660
ctaaaaatcg ataagtagct ccacctgaag agggatggaa catctgggta aggaaacaga 720
tggaataaaa aatcacctaa ttccctttgt ttgaataata cctatttcca aaaagtgtta 780
acaatctcaa aagaggaaact gtatttactt atatgtgatt aatgtgattt gaaatatgtt 840
aaatcaaagt gaaatattat attttttgaa taaaggagat aatagccct 889

```

<210> 296

<211> 687

<212> DNA

<213> Homo sapiens

<400> 296

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aatccccagg agacctttgc tcacatcttc tgtcacctta tcctggctct tgectcat 60
ttcttttcta gagtcacctc agggaaattc ttgccctcac tgaccttcct ccatttct 120
ccccaccttg atgagtttca gtaggtcttt ttgtcttctc ctgctcctaa gccatttgc 180
tctaacaagt ccccatctga aagttttatt gtgaatgagt gaatgaaacc ttagagagt 240
ttgcgagtta cattcatgtt gcccttggat ataaaaagag aggcagatgc atttgc 300
ggggtcttag tcgtgaatcc ttgtcctagg ccaatgtcca gaaaagtttt tctgggtat 360
actgtagaaa tgtcatggtt tcgggtctta gatttaagtc attgttctat tttagtga 420
tttttgtata aggtaagaga gatggattca gtttcattct tctacatgtg ggctatctac 480
ttttcccagc accatttatt aagtaggatg ttgtttcccc agtttatatt ttgtgtgtc 540
tagttaacga tcagttggtt gtaaatagtt ggctgtatct ctgggttctc tattctgtc 600
cattggtcta tgtgtctact ttataccag taccacgggt acactaaaat ctcagacttc 660
accactatac aattcatcca tgtaacc 687

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<210> 297

<211> 596

<212> DNA

<213> Homo sapiens

<400> 297

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tttggggatc agcatgcagg aagctctggt gatgacaccc caggggctgt tgtgaaacgg 60
attcaggctg ccaagcgtta ttcactgtgg agagattgtc atcaccagag ccgtgtctaa 120
aggatttagc cagggctgga tacggaaaac agaatggaag ggggctttgg gagaccagcc 180
cacctcacia gaaagagctg agagcctaga tttgggccag cgggggtagt ctctggacgg 240
aggcgccgac ggggctggag gaggagcgtt ttatgatgcg gccgtgggtg ctggccttgg 300
ctggggcttg tggcgactgg gtgcccgtgac gtgggggtgg accgggtaga gcggggtcgg 360
cagggggccg agtccgggcy cccccgcac cctgacctgt ctcccacaca gggttcgtgg 420
gcccccaaga aggagccgta cgcccgggag atgctggcga tctccttcat ctggccgtc 480
aaccgcaagc gcaagaagcg gcgggaggcg cgggggctgg gcagcagcac cgacgacgac 540
tcggagcagg aggcgcacaa gcctggggcg ggggccacag cgccggggac tcagga 596

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<210> 298

<211> 694

<212> DNA

<213> Homo sapiens

<400> 298

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agaaaactgc agcaccacag catgtgagtt actcaggtgt tgggggctag aaggacagt 60
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tcactctctc ctggcagtca tgcgggcagg aggtcctgaa aggaaaaccc attcagacaa 180
ctgttcccca atctaccagc catctgcagg ggtcagtgac cgtggccctc tccctctct 240
agaatgtgcc acttatgaag agtgcccatc gggaaaaagg agactcagct gtcccttggc 300
agcttgtgcc agtatccag ggcaagaagt tcacaggag cctcttgccc ttgcgcagag 360
ccactgtgag aggcgggtgg agccaacacc cttgggggag ggggcagtac tgctcggcac 420
atcccagcat caggtcagat cactgaaatt aaaaaatgtg aattaagttc atatccacct 480
tttggggaag caggacaaac caccacccca ccaagtgtgt gacttctcca tatccactg 540
cagtttccat tttttaaatg ggaattttca atcccctgtg cttgtctaac gtctgcttta 600
aaaagtttga gaccctgtta ctgtttgaaa atgcatgcat gttacgatga atctccaacc 660
tgaggaaaaa aataaaactc aaaaagcttt gtgg 694

```

<210> 299
 <211> 539
 <212> DNA
 <213> Homo sapiens

<400> 299
 aaatgatgta ctactgcatg tattgcaata ctccaggcctc ggaaagcttc ctttctcccc 60
 acattggaag gtttttatgg ttttgcatt tagtatggag caaaacgggt gtatccccct 120
 cggatatatac tagcctgcaa tgaagaaaga acgagaccca catcatcagc atggctccta 180
 gtcttgccat cagtcaaagg tgcaaaagca ttcattggcac caacgccgta ggtggggggt 240
 ggagcaagtg cgtgggtgga ggggtcggca gcataaactc gtccgtaact gcagaggtgt 300
 tacaagaaat ttcattctgt gcaacgaaga cgaactgatt tctgtcactg taggcagcgg 360
 cagtggcagg ggtaggctgg gcgtagcgg atgcagcata accaccataa atgtctgcac 420
 cataaaatcc atcctggtaa acaacaccgc cgtaggcccg gatcgggggc gggggcgccg 480
 cggccctgaa ggtgtgttac acggtgcgac cgcggcctcg cagggtcgcc cctcggtag 539

<210> 300
 <211> 561
 <212> DNA
 <213> Homo sapiens

<400> 300
 gcacagtaga ctgtagtgtg aggctcggcg gggcagtgcc catggaggcc gtgctgaacg 60
 agctgggtgc tgtggaggac cttgctgagc tgctgcccac agggagcaag gaggaacagc 120
 gggattacgt cttctacctg gccgtgggga actaccggct caaggaatac gagaaggcct 180
 taaagtacgt ccgcggttg ctgcagacag agccccagaa caaccaggcc aaggaaactg 240
 agcggctcat tgacaaggcc atgaagaaag atggactcgt gggcatggcc atcgtgggag 300
 gcatggccct ggtgtggcg ggactggccg gactcatcgg acttgctgtg tccaagtcac 360
 aaatcctgaa ggagacggcg gagccacggc agaacgctcc aggaagggcc tgtaccatcc 420
 tcgctgtcct ttccctgttc tccccctgcc ccccgctctc atcctctgtg gccttcagct 480
 aatttctgct cccctgagat tcgtccttca gcccacatcat gtgctttggg atgagtgtaa 540
 ataaaacggg gctgtggctt g 561

<210> 301
 <211> 804
 <212> DNA
 <213> Homo sapiens

<400> 301
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 acagtggaag cagcctgtat ggccgggccc ctgggaggca cactgggtcc ctgctgctgg 120
 ctgcacttgc ctgccttgtc cctctgctgc attggaacat ccgcagatag aagttttaga 180
 aagttctatt tttccaaacc aggatcctt actattgaca gattttcttt accaaaagaa 240
 aagacattta ttcttttgat gcacttgaat gccagagaac tgccttctt tttctcctc 300
 cctccctcc cagccctga gtcattgaac gcaaggagt tttgaagtt ctgctttgaa 360
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 gcctagagtt ctggacgagc gtgttttgta gcagggatga aagctagggc ctcttatttt 480
 tttctcttaa ttattattat atttctgagt taaacttaga agaaacaact atcaagctac 540
 aacttttct gccattttcc tgtggttgca gcctgtcttc ctttgaaatt gttttactct 600
 ctgagtttta tatgctggaa tccaatgcag agttggttt ggactgtgat caagacacct 660
 tttattaata aagaagagac acaggtgtag atatgtatat acaaaaagat gtacggtctg 720
 gccaaaccac ctcccagcc tttatgcaaa aaaaggggag aatcaaagct tcattccaga 780
 aatgtgcgtg aaaagtatct gtat 804

<210> 302
 <211> 659
 <212> DNA
 <213> Homo sapiens

<400> 302
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 tgacagaagt gctgcttgct gaggtgacca cgatgtgccc ggtgcttctt gggaagacga 120
 tggctctgctc gtaaggtagg cttgggtttg ggaccggcaa ggaggtgctg acggttgttg 180

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tggttggtcg cgacaggggg atgttcttgc tctggctata cactttgctg tggagccgta 240
cccagtcattg tcccagttgg aactcggctc tattttcagt ttcttcacac tacagaaggc 300
acttgattga aggggtgtgag gggagaaaac ttgcacatgt gaggccatac cttegtacac 360
ggggggccatc gggggccggg tggtcccggt tcatggcaac ggggacggga aagcggcgcg 420
cgagctcggc cccccagcc tcagtcggaa tctgccatct tgagcctgtg tctccgctct 480
cggcgagca gaggccggcc gcgcccgcac cacagcctcc cgtggccggc gccgggggag 540
ggggccgggc gcgcccagc agcccgccgc gccgctgccc ccggggcccg gcgccccggg 600
ctcggggctc ggggctcggg gcggccgggc gggcgaggcg gccgagggcg aggcgcga 659

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<210> 303

<211> 883

<212> DNA

<213> Homo sapiens

<400> 303

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tttttttttc catctgaatg tattttaata taaaaataac agctttcccc caattctcgc 60
tctaggaaaa tgtgctatgc tcaccttccc tctaccctcg tcccatcagg cccagagcca 120
aggccatagg gctgctgaat acacatgtga gggggccgag gggaagacaa cagtaccagg 180
agggcaggca gggcaccccc aggtcggcca gtggagggtt gggggtatcg atcccgccgg 240
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tgaccagcgg ggcaccccg ctgtagttgt gtctcggcat cctggggaag aggtggtgct 480
cgatctggaa gttgaggtgc ccgctgaacc agttggtgaa aagtgagggc tccacgttgc 540
aggtggtgct cagctgagag ctgaccaggt cccgtgctt ctgctggcgg atctccttgg 600
ggatgtggtt catctgtgtg atccacacga accagtggct ttccaggacc ctgtggggag 660
gctcgggcac tgccctaggt ccagctcacc acttaggcac cctgagtgga ggctggagag 720
cagctgtccc caagtggcct tgacttccct atctgtacaa taggattgtg gccatcgccc 780
ccttgccagt gtttaaagaa tctgaatgga gcagtgtcca ctgtgaggct gagtccagag 840
cagctccgac acccaccggg ccacttacaa gccagcttag aaa 883

```

<210> 304

<211> 597

<212> DNA

<213> Homo sapiens

<400> 304

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aacaatatgt cggacccacg gaggccgaac aaagtgtgta ggtacaagcc cccgcccagc 60
gaatgtaacc cggccttggg cgaaccgacg ccggactaca tgaacctgct gggcatgac 120
ttcagcatgt gcggcctcat gcttaagctg aagtgtgtgt cttgggtcgc tgtctactgc 180
tccttcacat gctttgccaa ctctcggagc tcggaggaca cgaagcaaat gatgagtagc 240
ttcatgctgt ccatctctgc cgtggtgatg tctatctgc agaactcctca gcccatgacg 300
ccccctggtt gataccagcc tagaagggtc acattttgga ccctgtctat ccactaggcc 360
tgggctttgg ctgctaaacc tgctgccttc agctgccatc ctggacttcc ctgaatgagg 420
ccgtctcggg gccccagct ggatagaggg aacctggccc tttcctaggg aacaccctag 480
gcttaccctt cctgcctccc ttccctgcc tgctgctggg ggagatgctg tccatgtttc 540
taggggtatt catttgcttt ctggtgaaa cctgttgta ataaagtttt tcactcc 597

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<210> 305

<211> 631

<212> DNA

<213> Homo sapiens

<400> 305

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caatgagtgt gatgagatat gcctttcagt tttgtcaact gtttttagagg caatggaacc 60
atgcaagaat gttcatgttc tacgaacggg attcagtgta gaactctctt atgctttctt 120
catgtggttt tctttgttcc tcatatatct ggaataaaaa aattgagatg aaaactaaac 180
tcctttcttg aggggaggag ggggtgggga ggccttgttg gtagtacag tctttcatac 240
cttattaagc ttaaaatcct gactctggat gacataggct ggaataactt ctcttagggt 300
ccataataac aaagatgtga gtaacattga aatctaaatt aatttatattt aaaacatagt 360
actggccagg cgcagtgact catgcctgta atcccagcac tttgggaggc cgaggcaggc 420
ggatcacgag gtccggagat cgagaccatg gtgaaagccc gtctctacta aaaatacaaa 480
aattagccgg gtgtggtggt ggggtgcctgt agtcccagct gcttgggagg ctgaggcagg 540
agaatggcgt gaaccaggga ggcagagctt gcagtgagct gagatcgccg cactgcactc 600

```

cagcctgggc aacagagcga gactctgtct c

631

<210> 306

<211> 748

<212> DNA

<213> Homo sapiens

<400> 306

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gaactgtccc ttgttaatta tgtaattccc ctgaaatggt ataatgaaga aactgaggct 60
ccgagagaag taccgcgcga gggtgcacgt ggtggagtc agtgggagtc ctgtagggtg 120
actcacagca gaagcctggt tatgtcccca ccacatggaa gccttctctg acccctccc 180
cagcctgccc aagcccgatg cttgctctgg gctcctgtag tgctggacac tcacctcagc 240
agtgcagggg gaagaggcct ccaggtcact cctgcctgtg gcatagagaa ggcataga 300
atggccttga gcacttaaag gctgaggctg gggctctgcc gtgcctggca tggagtccag 360
aggcctcagg acttggttaga aagatgattt cagcatcttc catcaggggc ctctgtcatg 420
ttcctggcag aagtttaaca cttggtcaat tagggaaata atgggagaca gttgtggtgg 480
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tagctgggca tgggtggctca tgccgtgtgt cccagctact tgggaggctg aggtgggagg 660
atggccttga cccaggaggc ggaagtgtga gtgagctagg gtcatgctac tgcactccag 720
tctgggcaac agagtgaagc tctgtccc 748

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<210> 307

<211> 909

<212> DNA

<213> Homo sapiens

<400> 307

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gccgcgtag cgcgtcttgg gtctcccggc tgccgctgct gccgcgcgcg cctcgggctcg 60
tggagccagg agcgacgtca ccgccatggc aggcatacaa gctttgatta gtttgtcctt 120
tgaggagca atcggactga tgtttttgat gcttggatgt gcccttccaa tatacaaaa 180
atactggccc ctctttgttc tttttttta catcctttca cctattccat actgcatagc 240
aagaagatta gtggatgata cagatgctat gagtaacgct tgtaaggaac ttgccatctt 300
tcttacaacg ggcattgtcg tgtcagcttt tggactccct attgtatttg ccagagcaca 360
tctgattgag tggggagcct gtgcacttgt tctcacagga aacacagtca tctttgcaac 420
tatactaggc tttttcttgg tctttggaag catgacgact tcagctggca gcagtgggtga 480
aaagaaatta ctgaactatt gtcaaatgga ctctctgtca tttgttggcc attcacgcac 540
acaggagatg gggcagttaa tgctgaatgg tatagcaagc ctcttggggg tatttttagt 600
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aaggattttc tcttttgtaa aagcttgact gatttcacac ttatctatag tatgcttttt 720
gtggtgtcct gctgaattta aatatttatg tgtttttcct gttaggttga ttttttttgg 780
aatcaatatg caatgttaaa cactttttta atgtaatcat ttgcattggt taggaattca 840
gaattccgcc ggctctatta ctggtcaagt acatcttttc tcttaaaatt atttagcctc 900
cattattac 909

```

<210> 308

<211> 603

<212> DNA

<213> Homo sapiens

<400> 308

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ggcaggatgg tcattctcaa aaacctggg gtccctgggc agagacaggc agggcccagt 120
ccaggggccc caggcctccc cagtcaccag gtgcgagccc cacttggaac caagtgttca 180
gagagggtccc cctctgccac ttgacaggga ccttcaaacc tcgacagctc cagctccctt 240
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gggcctgtgt ctgtgtctgt gcctgtgtct gtgatgggga gccgcctcgc acccctgttg 360
tctgcttgct tctttgtgtc tgttatcctg cccgcgtggg ggatccctt tccacatcc 420
gtgctgtgtc attgttgctc tgcctccttt caatgtgtca gtgcctgggg ggaggggagg 480
agcaacccct cagccccct gaacctgacc aaaagccatg gctgttgctc cccctttgt 540
atgatgcaaa tgctgaaatg tacaaaatca accatgacaa caaagaaaaa gaccttgtac 600
agc 603

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<210> 309

<211> 314
 <212> DNA
 <213> Homo sapiens

<400> 309
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 ctoggggaca ccaggggctt cctgattgac ggctatcctc gggaggtgaa gcaaggggaa 120
 gagttcggac gcaggattgg agaccccgcc gagccccctc tcccagttat cccatccccg 180
 catgcttcta gggagcgctt cttttcgtt cttgaggaat ttctgttctg gggcttgtcc 240
 ttccctttgca gctgttttga atgtagtttt ccttttctat ttatttgcac attaaagtta 300
 ataattgaat attg 314
 <210> 310
 <211> 677
 <212> DNA
 <213> Homo sapiens

<400> 310
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 accagggcca gctaaggcaa cgactccctc cccaaaccct tgggacctca gccagtccca 120
 aggtctgccct gacaatcagg caggctcccc accgtgaggc caagcctcct ctgccactgc 180
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 caggcttgggt tctagtgggc accactgggt ggcaacctcc ataactggcc cttaggccct 360
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 agcacaggca gaggggtgga gagcaatttt tggttttatt tttgtttctg aagtgggtgc 480
 tgtacctcca gccccaggg ggccttccct ggccacactt ctctgcccc caggcatcg 540
 ccattcccagc actttgtctc atgtcaccg taagatgccc tttgtctaat gtacctgagt 600
 gtatgtattt aaaaggactc acatgggcat cagagaattt atggctctgt atccaataaa 660
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<210> 311
 <211> 766
 <212> DNA
 <213> Homo sapiens

<400> 311
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 taggggaatg atgtttaaac acaaaaataa attttttttc atttccagaa acactattta 120
 tttatggttt ttttttttaa ttttttcttt ttgggggtga aattggcaga tgcctgaggt 180
 catagctgtg tcctgggtca ctgtggctgg tgaggacctc aaggacccca tcaagtgtac 240
 acagcagcag caaaatcaag ggatgacctt cctctggggc cccctgtcct cagcacattc 300
 caggcagctg tgcctgacc cacagggacc cgtggggatg ggaggaggtc caggcctgtg 360
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 tataaaggaa aagaggacct gtcagatagg cagccccatg ctacgtgatt ctttatgttg 540
 tgttgttttg ttttgtaaat tgtataattt ttaaatactt gatttttaaa aaaagaaaaa 600
 agtacaaaaa aatcttgtaa tggccttaag aagggttag tgcatctttc aggggtcact 660
 ctgccatggg gataaaatag ctgtttcaca aacagtttta tttaaaaaaa caaaaaacaa 720
 aaaaaatcaa aaaatcaaaa aaataataaa cttcatttta acctcg 766

<210> 312
 <211> 550
 <212> DNA
 <213> Homo sapiens

<400> 312
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 ggggaacaggc aagggatcag atgcccctga caccacgcct ctggccacac cagatgcctc 120
 tgcagtccct gacagcctct tcagtgtccc tccgtcggtg atgtccttac tgtccccagc 180
 cagggccggg gaccggtgtt tcaactgagga cctgcattag aaacattttt taaattgttg 240
 tacaggaaga gatgtgtcta aaacagcatc ttaaagctga gtgtatttct ttgcacaagg 300
 ggtcatgctg atgaattctt ctttcattct gatctttgtt cagccaacag gagcgtcctt 360
 ttctaattgtc ttccattcct accccccacc caaaaaacaa agaaatattt gtagcttgct 420
 atctgtattt gaatttttag caattttata tttagatact ttgaaaaatg taaatgacta 480

atttggtcat taaatcttgt gacatattcg atattaaaat gatattaaaa taaaagtcac 540
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<210> 313

<211> 868

<212> DNA

<213> Homo sapiens

<400> 313

ggccccctgg ccatgggcct ggcccagccc cgactccttt ctgggccctc ccaggagtca 60
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cagtgggacc agctagtgtc ccacaagcgg gtgcacgtag ctgaggccct ggaggaggc 600
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gggtggagatg ccgtcgaccg ccccttccag tgtgctgtt gtggcaagcg cttccggcac 720
aagcccaact tgatcgctca ccgcgcgtg cacacgggcg agcggcccca ccagtgc 780
gagtgcggga agcgctttac caataagccc tatctgactt cgcaccggcg catccacacc 840
ggcgagaagc cctaccctg caaagagt 868

<210> 314

<211> 592

<212> DNA

<213> Homo sapiens

<400> 314

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tctgggggccc ctacccgggg tcacggggag ggctgtcctt ggggactcta ggatggcttc 180
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ctcattgaca agagtctgt cgggaaaacc acctgatccc tagggatttg tcatcttaag 300
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gtttactcat gaatgttaaa tgttaaaacg cagcgtctta acctgcata ttatttactt 420
gcaaagtgtc tgtaatctgt aattgtgatg cctctgatgg aataaaatta tcttttttca 480
gtctcctcct aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa 540
aaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa gg 592

<210> 315

<211> 405

<212> DNA

<213> Homo sapiens

<400> 315

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ggggcctgga ggagtgcctt tgaggaggtc agtccggca ggtggacaga ggacgcctgg 180
catgggctgc ttactgggac cccaggcggc cctggccatg gccacagtct tccttctttt 240
ggcgtgtggg ctggtaccag atctggggat tttctaaagg gactgggggg aggggagggc 300
attgtcaatg gtggtatctt tagcctgaga cagaagattt ttaaaggcaa aattatattt 360
ctggtttgtt gtttcagaag accaataaag actgtatttt cctat 405

<210> 316

<211> 771

<212> DNA

<213> Homo sapiens

<400> 316

cgcgggccgg gccgggacgg ggactgtcgg ctgcaggcgg ccatgcccac caacttcacc 60
gtgggtgccc tggaggctca cgccgacggc ggccggggac agactgccga gcggacggag 120
gtcccgggca ccccgagggg ccccgagccc gagcgcccca gcccgggaga tggaaatcca 180

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agagaaaaca gccattcct caacaatgtc gaggtggaac aagagagctt ctttgaagg 240
aagaacatgg cacttttcga ggaggagatg gacagtaaac ccatggtgtc ctgctgtctc 300
aacaagctgg ccaactacac caacctgagc cagggcgtgg tggagcacga ggaggacgag 360
gagagccggc ggcgggaggc caaggctccg cgcattggca ccttcacgg cgtctacctg 420
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<210> 317

<211> 664

<212> DNA

<213> Homo sapiens

<400> 317

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cagccagccg ggtgcccatt tcacgcagag ctctctgagc gggagggtgga agaaaggatg 180
gctctgggtt ccacagagct gggacttcat gttcttctag agagggccac aagagggcca 240
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ccaaggtaa aacgagagcc aacgggcaca agcattctat atataagtgg ctcatagggt 600
gtttattttt ttctatttaa gaatttggtt tattaataa atataaaaat ctttgtaaat 660
ctcc 664

```

<210> 318

<211> 706

<212> DNA

<213> Homo sapiens

<400> 318

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cagagaagcg tgaaggcctg gctgccgggc aggtgaactc tccacggggg ctagggcccg 60
cgaaagggtt cggaaaccgag tcagcgcgcc ttgcccggcag gattcacgcc gctgtgacct 120
ggaggctctc agggggcgaa gccccggcct aggcctcgcg gagatgcccc gctgagggtg 180
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taaatgtggc gacttgtgca cacatgtaga gacctttgta tgtaagtatt acatcttcta 540
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gtaaaatgta taaatatagg ccagggtgca acggcttat cctataatcc tagcactttg 660
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<210> 319

<211> 493

<212> DNA

<213> Homo sapiens

<400> 319

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accacctct cgcctgtccc cgtttgcgtt ggcgtgctg cctgggttat aaacataacc 60
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cagtcctcgt ggagaaacac tggacgtgtc tctctacaaa agagctttta ctgttagtgg 420
tctagttttt ttttttctg tttctcaaaa ttaatcagt acatagagag ctgccaatca 480
gactgcagtc tgt 493

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<210> 320
 <211> 514
 <212> DNA
 <213> Homo sapiens

<400> 320
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 cttgatgctg cactgagctg gacaggggga gtccgggcag gggactcttg gggctcggga 240
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 ttcccagcac atgcagaatg actccagtgg ttccatcgtc cctcctgcc ctgtgtacct 360
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 gcccgggatc tgcacttctt cccctttcac ctacctgtac acctaacctg gccttagact 480
 gagctttatt taagaataaa atcgtggtgg tggc 514

<210> 321
 <211> 395
 <212> DNA
 <213> Homo sapiens

<400> 321
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 gccttctgcc cttccttggg tctccggaac ccagcttctc ctaaccgctt tcgctgcccc 180
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 tggagccag gggctgcgtt ccccttgggg ccggggcggg agagaggacc tcggtggtag 300
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 tgggtcccgc ccggcgagcg acgcagggat aaccc 395

<210> 322
 <211> 550
 <212> DNA
 <213> Homo sapiens

<400> 322
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 cggccaggcc tccagcttcc cctgccccgg gcctggggct gtcactggcc ctgatccgaa 180
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 tgtgttctcc agctttgtag cagcagcctt gacaaaacca ggcgactgt accaaggcaa 480
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 ttgacttcag 550

<210> 323
 <211> 415
 <212> DNA
 <213> Homo sapiens

<400> 323
 gttctgtcgg gaggacagt ctgatcgtgt ctgagcatca ggaaaggaga aaggcagagg 60
 gagagcgctg agaagactgt tcacgccaga gtgcttattt atttttaatt tactgctata 120
 ggataagcaa ccaggtagtg ttocctaaca ttagcgttac caaaattaaa gttcaaatta 180
 tatgtttaaa atattgtaga agatatatat ttatactgga ctacttttac accttcta 240
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 cccacttgcc tgttgggtgcc actccatccc gggccccagg gatgccagct cagggtgac 360
 cacagcagcc ctgcgtgggc atcacctcct accccagccc ccatcctggg ctgct 415

<210> 324
 <211> 763

<212> DNA

<213> Homo sapiens

<400> 324

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gcctcgattg ggtggctctg gctgccagga agattccagc cccattccgg ccccaaatcc 60
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aggcgggctg ggtgcaccgc gacctcaagc cggagaacat cctgtaagcc gacgacacgc 720
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<210> 325

<211> 1080

<212> DNA

<213> Homo sapiens

<400> 325

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<210> 326

<211> 1549

<212> DNA

<213> Homo sapiens

<400> 326

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tgagtgtgtg gacggccgca gacacggcgg tatattactg tggcagagtg aagggtgggt 420
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cgggtaaacc caccatgtc aatgtgtctg ttgtcatggc ggaggtggac ggcacctgct 1500
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<210> 327

<211> 1635

<212> DNA

<213> Homo sapiens

<400> 327

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<210> 328

<211> 1054

<212> DNA

<213> Homo sapiens

<400> 328

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gccgagtact gccccgtgct gcgttcgctg cgggtgcggc actgccacca tgtggcggag 780
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<210> 329

<211> 1159

<212> DNA

<213> Homo sapiens

<400> 329

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tcactctggg tggagggggg tgtgtccttt gaattcccaa atggaaatgg ctagagtttt 420
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<210> 330

<211> 1685

<212> DNA

<213> Homo sapiens

<400> 330

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<210> 331

<211> 1942

<212> DNA

<213> Homo sapiens

<400> 331

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<210> 332

<211> 1153

<212> DNA

<213> Homo sapiens

<400> 332

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<210> 333

<211> 1631

<212> DNA

<213> Homo sapiens

<400> 333

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<210> 334

<211> 1618

<212> DNA

<213> Homo sapiens

<400> 334

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<210> 335

<211> 1978

<212> DNA

<213> Homo sapiens

<400> 335

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<210> 336

<211> 1436

<212> DNA

<213> Homo sapiens

<400> 336

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<210> 337

<211> 1955

<212> DNA

<213> Homo sapiens

<400> 337

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<211> 506

<212> DNA

<213> Homo sapiens

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<212> DNA

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 <211> 1755

<212> DNA
<213> Homo sapiens

<400> 342

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<211> 2102

<212> DNA

<213> Homo sapiens

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<211> 2890

<212> DNA

<213> Homo sapiens

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<211> 1604

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<213> Homo sapiens

<400> 345

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<210> 346

<211> 1974

<212> DNA

<213> Homo sapiens

<400> 346

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<210> 347

<211> 1683

<212> DNA

<213> Homo sapiens

<400> 347

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<210> 348

<211> 1684

<212> DNA

<213> Homo sapiens

<400> 348

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<210> 349

<211> 1514

<212> DNA

<213> Homo sapiens

<400> 349

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<210> 350

<211> 1741

<212> DNA

<213> Homo sapiens

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<210> 351

<211> 2299

<212> DNA

<213> Homo sapiens

<400> 351

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<210> 352

<211> 2477

<212> DNA

<213> Homo sapiens

<400> 352

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<211> 2439

<212> DNA

<213> Homo sapiens

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<212> DNA

<213> Homo sapiens

<400> 354

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<212> DNA

<213> Homo sapiens

<400> 355

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<212> DNA

<213> Homo sapiens

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<212> DNA

<213> Homo sapiens

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<210> 358

<211> 2415

<212> DNA

<213> Homo sapiens

<400> 358

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<211> 1463

<212> DNA

<213> Homo sapiens

<400> 359

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<210> 360

<211> 1871

<212> DNA

<213> Homo sapiens

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<210> 361

<211> 2400

<212> DNA

<213> Homo sapiens

<400> 361

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<210> 362

<211> 1798

<212> DNA

<213> Homo sapiens

<400> 362

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<212> DNA

<213> Homo sapiens

<400> 363

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<211> 2803

<212> DNA

<213> Homo sapiens

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<210> 365

<211> 2340

<212> DNA

<213> Homo sapiens

<400> 365

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<213> Homo sapiens

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<211> 2684

<212> DNA

<213> Homo sapiens

<400> 372

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<211> 2173

<212> DNA

<213> Homo sapiens

<400> 373

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<211> 2545

<212> DNA

<213> Homo sapiens

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<210> 375

<211> 1826

<212> DNA

<213> Homo sapiens

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<210> 376

<211> 1250

<212> DNA

<213> Homo sapiens

<400> 376

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<210> 377

<211> 2348

<212> DNA

<213> Homo sapiens

<400> 377

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<210> 378

<211> 1860

<212> DNA

<213> Homo sapiens

<400> 378

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<211> 2083
 <212> DNA
 <213> Homo sapiens

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<210> 380
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 <212> DNA
 <213> Homo sapiens

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<210> 382

<211> 707

<212> DNA

<213> Homo sapiens

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<210> 383

<211> 1694

<212> DNA

<213> Homo sapiens

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1694

<210> 384

<211> 2928

<212> DNA

<213> Homo sapiens

<400> 384

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<211> 594

<212> DNA

<213> Homo sapiens

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<210> 386

<211> 279

<212> DNA

<213> Homo sapiens

<400> 386

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<210> 387

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<212> DNA

<213> Homo sapiens

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 <211> 493
 <212> DNA
 <213> Homo sapiens

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 <212> DNA
 <213> Homo sapiens

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<210> 391

<211> 1724

<212> DNA

<213> Homo sapiens

<400> 391

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 <213> Homo sapiens

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<210> 394
 <211> 1646
 <212> DNA
 <213> Homo sapiens

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<213> Homo sapiens

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<212> DNA

<213> Homo sapiens

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3748

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<213> Homo sapiens

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<213> Homo sapiens

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<212> DNA

<213> Homo sapiens

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<213> Homo sapiens

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<212> DNA

<213> Homo sapiens

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<212> DNA

<213> Homo sapiens

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<211> 1594

<212> DNA

<213> Homo sapiens

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 <213> Homo sapiens

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<210> 415

<211> 1862

<212> DNA

<213> Homo sapiens

<400> 415

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<210> 416

<211> 2142

<212> DNA

<213> Homo sapiens

<400> 416

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<211> 1493

<212> DNA

<213> Homo sapiens

<400> 417

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<210> 418

<211> 1690

<212> DNA

<213> Homo sapiens

<400> 418

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<210> 419

<211> 1621

<212> DNA

<213> Homo sapiens

<400> 419

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<210> 420

<211> 1661

<212> DNA

<213> Homo sapiens

<400> 420

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<210> 421

<211> 1851

<212> DNA

<213> Homo sapiens

<400> 421

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<210> 422

<211> 1713

<212> DNA

<213> Homo sapiens

<400> 422

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<211> 799

<212> DNA

<213> Homo sapiens

<400> 423

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1688

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<211> 3075

<212> DNA

<213> Homo sapiens

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<211> 2164

<212> DNA

<213> Homo sapiens

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<211> 2677

<212> DNA

<213> Homo sapiens

<400> 427

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<212> DNA

<213> Homo sapiens

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<210> 429

<211> 1695

<212> DNA

<213> Homo sapiens

<400> 429

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<210> 430

<211> 2576

<212> DNA

<213> Homo sapiens

<400> 430

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<210> 431

<211> 2624

<212> DNA

<213> Homo sapiens

<400> 431

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<210> 432

<211> 1585

<212> DNA

<213> Homo sapiens

<400> 432

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<210> 433

<211> 1331

<212> DNA

<213> Homo sapiens

<400> 433

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<210> 434

<211> 2179

<212> DNA

<213> Homo sapiens

<400> 434

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<210> 440

<211> 1411

<212> DNA

<213> Homo sapiens

<400> 440

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<210> 441

<211> 1501

<212> DNA

<213> Homo sapiens

<400> 441

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<211> 1556

<212> DNA

<213> Homo sapiens

<400> 442

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<210> 443

<211> 1853

<212> DNA

<213> Homo sapiens

<400> 443

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<210> 444

<211> 1963

<212> DNA

<213> Homo sapiens

<400> 444

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<210> 445

<211> 2181

<212> DNA

<213> Homo sapiens

<400> 445

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<211> 609

<212> DNA

<213> Homo sapiens

<400> 446

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<211> 992

<212> DNA

<213> Homo sapiens

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<210> 448

<211> 1110

<212> DNA

<213> Homo sapiens

<400> 448

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<210> 449

<211> 3998

<212> DNA

<213> Homo sapiens

<400> 449

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<210> 450

<211> 1485

<212> DNA

<213> Homo sapiens

<400> 450

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<210> 451

<211> 1016

<212> DNA

<213> Homo sapiens

<400> 451

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<210> 452

<211> 3167

<212> DNA

<213> Homo sapiens

<400> 452

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<210> 453

<211> 793

<212> DNA

<213> Homo sapiens

<400> 453

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<210> 454

<211> 2764

<212> DNA

<213> Homo sapiens

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<211> 4153

<212> DNA

<213> Homo sapiens

<400> 455

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<211> 2546

<212> DNA

<213> Homo sapiens

<400> 456

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<211> 505

<212> DNA

<213> Homo sapiens

<400> 457

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<211> 3410

<212> DNA

<213> Homo sapiens

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<211> 1656

<212> DNA

<213> Homo sapiens

<400> 459

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<210> 460

<211> 1588

<212> DNA

<213> Homo sapiens

<400> 460

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<212> DNA

<213> Homo sapiens

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 <211> 1284
 <212> DNA
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 <213> Homo sapiens

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<211> 1239

<212> DNA

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<212> DNA

<213> Homo sapiens

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<213> Homo sapiens

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<213> Homo sapiens

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<213> Homo sapiens

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<211> 2849

<212> DNA

<213> Homo sapiens

<400> 481

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<210> 482

<211> 3310

<212> DNA

<213> Homo sapiens

<400> 482

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<211> 2649

<212> DNA

<213> Homo sapiens

<400> 483

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<211> 2125

<212> DNA

<213> Homo sapiens

<400> 484

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<211> 1948

<212> DNA

<213> Homo sapiens

<400> 485

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<211> 3364

<212> DNA

<213> Homo sapiens

<400> 486

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<211> 801

<212> DNA

<213> Homo sapiens

<400> 487

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 <213> Homo sapiens

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<211> 571

<212> DNA

<213> Homo sapiens

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<211> 1564

<212> DNA

<213> Homo sapiens

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<211> 786

<212> DNA

<213> Homo sapiens

<400> 492

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<212> DNA

<213> Homo sapiens

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<211> 1262

<212> DNA

<213> Homo sapiens

<400> 494

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<210> 495

<211> 503

<212> DNA

<213> Homo sapiens

<400> 495

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<210> 496

<211> 706

<212> DNA

<213> Homo sapiens

<400> 496

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<210> 497

<211> 1410

<212> DNA

<213> Homo sapiens

<400> 497

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<210> 498

<211> 818

<212> DNA

<213> Homo sapiens

<400> 498

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<210> 499

<211> 1099

<212> DNA

<213> Homo sapiens

<400> 499

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<210> 500

<211> 1197

<212> DNA

<213> Homo sapiens

<400> 500

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<210> 501

<211> 1710

<212> DNA

<213> Homo sapiens

<400> 501

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<210> 502

<211> 2046

<212> DNA

<213> Homo sapiens

<400> 502

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<211> 2331

<212> DNA

<213> Homo sapiens

<400> 503

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<210> 504

<211> 2170

<212> DNA

<213> Homo sapiens

<400> 504

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<210> 505

<211> 1943

<212> DNA

<213> Homo sapiens

<400> 505

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<210> 506

<211> 2300

<212> DNA

<213> Homo sapiens

<400> 506

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<210> 507

<211> 1989

<212> DNA

<213> Homo sapiens

<400> 507

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<210> 508

<211> 2262

<212> DNA

<213> Homo sapiens

<400> 508

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<210> 509

<211> 734

<212> DNA

<213> Homo sapiens

<400> 509

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<210> 510

<211> 1636

<212> DNA

<213> Homo sapiens

<400> 510

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<210> 511

<211> 1856

<212> DNA

<213> Homo sapiens

<400> 511

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<210> 512

<211> 1247

<212> DNA

<213> Homo sapiens

<400> 512

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<210> 513

<211> 1551

<212> DNA

<213> Homo sapiens

<400> 513

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<210> 514

<211> 1549

<212> DNA

<213> Homo sapiens

<400> 514

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<210> 515

<211> 2282

<212> DNA

<213> Homo sapiens

<400> 515

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<210> 516

<211> 1417

<212> DNA

<213> Homo sapiens

<400> 516

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<210> 517

<211> 1869

<212> DNA

<213> Homo sapiens

<400> 517

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<210> 518

<211> 355

<212> DNA

<213> Homo sapiens

<400> 518

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<210> 519

<211> 975

<212> DNA

<213> Homo sapiens

<400> 519

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<210> 520

<211> 862

<212> DNA

<213> Homo sapiens

<400> 520

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<210> 521

<211> 2160

<212> DNA

<213> Homo sapiens

<400> 521

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<210> 522

<211> 2008

<212> DNA

<213> Homo sapiens

<400> 522

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<210> 523

<211> 1666

<212> DNA

<213> Homo sapiens

<400> 523

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<210> 524

<211> 1933

<212> DNA

<213> Homo sapiens

<400> 524

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<210> 525

<211> 2012

<212> DNA

<213> Homo sapiens

<400> 525

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<211> 1451

<212> DNA

<213> Homo sapiens

<400> 526

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<210> 527

<211> 1703

<212> DNA

<213> Homo sapiens

<400> 527

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<210> 528

<211> 1684

<212> DNA

<213> Homo sapiens

<400> 528

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<210> 529

<211> 1427

<212> DNA

<213> Homo sapiens

<400> 529

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<210> 530

<211> 431

<212> DNA

<213> Homo sapiens

<400> 530

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<210> 531

<211> 774

<212> DNA

<213> Homo sapiens

<400> 531

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<210> 532

<211> 1458

<212> DNA

<213> Homo sapiens

<400> 532

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<210> 533

<211> 2924

<212> DNA

<213> Homo sapiens

<400> 533

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<210> 534

<211> 1564

<212> DNA

<213> Homo sapiens

<400> 534

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<210> 535

<211> 1869

<212> DNA

<213> Homo sapiens

<400> 535

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<211> 1014

<212> DNA

<213> Homo sapiens

<400> 536

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<210> 537

<211> 2015

<212> DNA

<213> Homo sapiens

<400> 537

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<210> 538

<211> 1202

<212> DNA

<213> Homo sapiens

<400> 538

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<210> 539

<211> 830

<212> DNA

<213> Homo sapiens

<400> 539

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<210> 540

<211> 1738

<212> DNA

<213> Homo sapiens

<400> 540

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<210> 541

<211> 403

<212> DNA

<213> Homo sapiens

<400> 541

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<210> 542

<211> 1776

<212> DNA

<213> Homo sapiens

<400> 542

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<210> 543

<211> 1355

<212> DNA

<213> Homo sapiens

<400> 543

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<210> 544

<211> 1643

<212> DNA

<213> Homo sapiens

<400> 544

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<210> 545

<211> 2383

<212> DNA

<213> Homo sapiens

<400> 545

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<210> 546

<211> 827

<212> DNA

<213> Homo sapiens

<400> 546

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<210> 547

<211> 2305

<212> DNA

<213> Homo sapiens

<400> 547

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<210> 548

<211> 632

<212> DNA

<213> Homo sapiens

<400> 548

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<211> 4334

<212> DNA

<213> Homo sapiens

<400> 549

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<211> 1581

<212> DNA

<213> Homo sapiens

<400> 550

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<210> 551

<211> 1865

<212> DNA

<213> Homo sapiens

<400> 551

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<211> 1439

<212> DNA

<213> Homo sapiens

<400> 552

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<210> 553

<211> 2018

<212> DNA

<213> Homo sapiens

<400> 553

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<211> 1685

<212> DNA

<213> Homo sapiens

<400> 554

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1685

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<211> 1955

<212> DNA

<213> Homo sapiens

<400> 555

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<211> 621

<212> DNA

<213> Homo sapiens

<400> 556

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<211> 2823

<212> DNA

<213> Homo sapiens

<400> 557

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<210> 558

<211> 2839

<212> DNA

<213> Homo sapiens

<400> 558

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<210> 559

<211> 1631

<212> DNA

<213> Homo sapiens

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<211> 2214

<212> DNA

<213> Homo sapiens

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<211> 2098

<212> DNA

<213> Homo sapiens

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<211> 1684

<212> DNA

<213> Homo sapiens

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<211> 1688

<212> DNA

<213> Homo sapiens

<400> 563

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<211> 1028

<212> DNA

<213> Homo sapiens

<400> 564

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<211> 1790

<212> DNA

<213> Homo sapiens

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<211> 1512

<212> DNA

<213> Homo sapiens

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<211> 612

<212> DNA

<213> Homo sapiens

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<211> 2163

<212> DNA

<213> Homo sapiens

<400> 568

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<210> 569

<211> 2541

<212> DNA

<213> Homo sapiens

<400> 569

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<210> 570

<211> 2387

<212> DNA

<213> Homo sapiens

<400> 570

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<210> 571

<211> 506

<212> DNA

<213> Homo sapiens

<400> 571

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<210> 572

<211> 2116

<212> DNA

<213> Homo sapiens

<400> 572

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<210> 573

<211> 1986

<212> DNA

<213> Homo sapiens

<400> 573

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<210> 574

<211> 2059

<212> DNA

<213> Homo sapiens

<400> 574

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<211> 951

<212> DNA

<213> Homo sapiens

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<210> 576

<211> 703

<212> DNA

<213> Homo sapiens

<400> 576

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<210> 577

<211> 1288

<212> DNA

<213> Homo sapiens

<400> 577

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<210> 578

<211> 2234

<212> DNA

<213> Homo sapiens

<400> 578

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<210> 579

<211> 1807

<212> DNA

<213> Homo sapiens

<400> 579

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<210> 580

<211> 1558

<212> DNA

<213> Homo sapiens

<400> 580

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<210> 581

<211> 1588

<212> DNA

<213> Homo sapiens

<400> 581

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<210> 582

<211> 2306

<212> DNA

<213> Homo sapiens

<400> 582

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2306

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<210> 583

<211> 1765

<212> DNA

<213> Homo sapiens

<400> 583

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<210> 584

<211> 2084

<212> DNA

<213> Homo sapiens

<400> 584

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<210> 591

<211> 1539

<212> DNA

<213> Homo sapiens

<400> 591

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<210> 592

<211> 1875

<212> DNA

<213> Homo sapiens

<400> 592

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<210> 593

<211> 1838

<212> DNA

<213> Homo sapiens

<400> 593

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<210> 594

<211> 2061

<212> DNA

<213> Homo sapiens

<400> 594

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<210> 595

<211> 1429

<212> DNA

<213> Homo sapiens

<400> 595

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<210> 596

<211> 760

<212> DNA

<213> Homo sapiens

<400> 596

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<210> 597

<211> 1924

<212> DNA

<213> Homo sapiens

<400> 597

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<210> 598

<211> 2460

<212> DNA

<213> Homo sapiens

<400> 598

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<210> 605

<211> 1704

<212> DNA

<213> Homo sapiens

<400> 605

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<210> 606

<211> 1661

<212> DNA

<213> Homo sapiens

<400> 606

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<210> 607

<211> 478

<212> DNA

<213> Homo sapiens

<400> 607

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<210> 608

<211> 654

<212> DNA

<213> Homo sapiens

<400> 608

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<210> 609

<211> 1435

<212> DNA

<213> Homo sapiens

<400> 609

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<210> 610

<211> 1943

<212> DNA

<213> Homo sapiens

<400> 610

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<210> 611

<211> 1714

<212> DNA

<213> Homo sapiens

<400> 611

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<210> 612

<211> 1490

<212> DNA

<213> Homo sapiens

<400> 612

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<210> 613

<211> 2078

<212> DNA

<213> Homo sapiens

<400> 613

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<212> DNA

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<212> DNA

<213> Homo sapiens

<400> 615

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<212> DNA

<213> Homo sapiens

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<211> 2700

<212> DNA

<213> Homo sapiens

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<211> 1518

<212> DNA

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<211> 2151

<212> DNA

<213> Homo sapiens

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<211> 1611

<212> DNA

<213> Homo sapiens

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MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL,
TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

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patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
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— with international search report

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: POLYNUCLEOTIDES ENCODING NOVEL SECRETED PROTEINS

(57) Abstract: Isolated polynucleotides which have been derived from a variety of human tissue sources, and which encode novel secreted proteins, are provided. Also provided are methods for producing proteins using these polynucleotides, and the proteins so produced.

WO 01/77290 A3



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/10295

A. CLASSIFICATION OF SUBJECT MATTER

IPC(?) : Please See Extra Sheet.

US CL : Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 536/23.1, 23.5, 24.31; 580/300, 350; 435/6, 69.1, 252.3, 320.1, 325

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Database: GenEmbl; Accession NO: AC002401; Birren et al. "Homo sapiens chromosome 17, clone RPC875H18", complete sequence; 10 November 1997; having 98.5% sequence identity to SEQ ID NO: 1, see entire document.	1-4
X, P	Database: EST; Accession NO: AL525190; Li et al.: "Full length cDNA libraries and normalization"; 13 February 2001; having 81.1% sequence identity to SEQ ID NO: 1; vector: pCMVSPORT 6; host cell: DH10B; see entire document.	1-6

☐ Further documents are listed in the continuation of Box C
 ☐ See patent family annex

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"N" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubt on priority claims) or which is cited to establish the publication date of another citation or other special reason (as specified)	"X" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

04 NOVEMBER 2001

Date of mailing of the international search report

31 DEC 2001

 Name and mailing address of the ISA/US
 Commissioner of Patents and Trademarks
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/10295

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-7, all in part (SEQ ID NO. 1).

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/10295

A. CLASSIFICATION OF SUBJECT MATTER:

IPC (7)

C07H 21/02, 21/04; C07K 3/00, 14/00; C12Q 1/68, C12P 21/06, C12N 1/20, 15/63, 5/00

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

536/23.1, 23.5, 24.31; 530/300, 350; 435/6, 69.1, 252.3, 320.1, 325

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used)

Sequence Search (Database: GenEmbl, N_Geneseq_0601, EAST, Issued_Patents_NA)

EAST (Database: USPAT, DERWENT, EPO, JPO)

STN (Database: BIOSIS, CAPLUS, EMBASE, MEDLINE, SCISEARCH)

Search Terms: polynucleotide, DNA, nucleic acid, secreted protein

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Groups 1-625, claims 1-7, all in part, drawn to the special technical feature of an isolated nucleic acid of SEQ ID NO 1-625, vector, host cell and process for producing protein, wherein values of SEQ IDs 1-625 of claim 1 correspond to values of SEQ ID NO: 1-625 of claims 2 and 3. For examples,

Group 1 is the main invention and this correlates to SEQ ID NO 1 of claims 1-3
If group 2 is elected, this correlates to SEQ ID NO: 2 of claims 1-3

Groups 626-1250, claim 8, in part, drawn to the special technical feature of a protein encoded by the polynucleotides of SEQ ID NO: 1-625, wherein values of SEQ IDs 1-625 of claim 8 correspond to values of SEQ ID NO 1-625 of claims 1-3. For examples,

If group 626 is elected, this correlates to SEQ ID NO 1 of claims 1-3
If group 627 is elected, this correlates to SEQ ID NO: 2 of claims 1-3

of claims 1-3.

Groups 1251-1575, claim 9, in part, drawn to the special technical feature of an isolated antibody which binds to a protein encoded by the polynucleotides of SEQ ID NO 1-625, wherein values of SEQ IDs 1-625 of claim 9 correspond to values of SEQ ID NO: 1-625 of claims 1, 2 and 3. For examples,

If group 1251 is elected, this correlates to SEQ ID NO 1 of claims 1-3
If group 1252 is elected, this correlates to SEQ ID NO 2 of claims 1-3

Groups 1576-2500, claims 10, 12, 13, all in part, drawn to the special technical feature of a method of detecting a protein in a biological sample by determining the binding of the protein by a specific antibody, wherein the protein is encoded by the polynucleotides of SEQ ID NO 1-625, wherein values of SEQ IDs 1-625 of claims 10, 12, 13 correspond to values of SEQ ID NO 1-625 of claims 1, 2 and 3. For examples,

If group 1576 is elected, this correlates to SEQ ID NO 1 of claims 1-3
If group 1577 is elected, this correlates to SEQ ID NO 2 of claims 1-3

Groups 2501-3125, claims 11, 14, 15, all in part, drawn to the special technical feature of a method of detecting a polynucleotide in a biological sample by determining the hybridization of the polynucleotide by a polynucleotide reagent, wherein the polynucleotide is set forth in SEQ ID NO: 1-625, wherein values of SEQ IDs 1-625 of claims 11, 12, 13 correspond to values of SEQ ID NO: 1-625 of claims 1, 2 and 3. For examples,

If group 2501 is elected, this correlates to SEQ ID NO 1 of claims 1-3

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If group 2502 is elected, this correlates to SEQ ID NO. 2 of claims 1-3

Groups 3126-3750, claim 16, in part, drawn to the special technical feature of a method of identifying a compound that modulates the activity of the protein by monitoring the effect of the test compound on the activity of the protein, wherein the protein is encoded by the polynucleotides of SEQ ID NO: 1-625, wherein values of SEQ IDs 1-625 of claim 14 correspond to values of SEQ ID NO: 1-625 of claims 1, 2 and 3. For examples,

If group 3126 is elected, this correlates to SEQ ID NO: 1 of claims 1-3.

If group 3127 is elected, this correlates to SEQ ID NO: 2 of claims 1-3.

Groups 3751-4375, claim 17, in part, drawn to the special technical feature of a method of identifying a compound that modulates the expression of the polynucleotide by monitoring the effect of the test compound on the expression of the polynucleotide, wherein polynucleotide is set forth in SEQ ID NO: 1-625, wherein values of SEQ IDs 1-625 of claim 15 correspond to values of SEQ ID NO: 1-625 of claims 1, 2 and 3. For examples,

If group 3751 is elected, this correlates to SEQ ID NO: 1 of claims 1-3.

If group 3752 is elected, this correlates to SEQ ID NO: 2 of claims 1-3.

Groups 4376-5000, claim 18, in part, drawn to the special technical feature of a method of identifying a compound that modulates the production of the protein by monitoring the effect of the test compound on the production of the protein, wherein the protein is encoded by the polynucleotides of SEQ ID NO: 1-625, wherein values of SEQ IDs 1-625 of claim 16 correspond to values of SEQ ID NO: 1-625 of claims 1, 2 and 3. For examples,

If group 4376 is elected, this correlates to SEQ ID NO: 1 of claims 1-3.

If group 4377 is elected, this correlates to SEQ ID NO: 2 of claims 1-3.

Groups 5001-5625, claim 19, in part, drawn to the special technical feature of a method for treating a disorder characterized by aberrant expression of the polynucleotide by administering a compound that modulates expression of the polypeptide, wherein polynucleotide is set forth in SEQ ID NO: 1-625, wherein values of SEQ IDs 1-625 of claim 17 correspond to values of SEQ ID NO: 1-625 of claims 1, 2 and 3. For examples,

If group 5001 is elected, this correlates to SEQ ID NO: 1 of claims 1-3.

If group 5002 is elected, this correlates to SEQ ID NO: 2 of claims 1-3.

Groups 5626-6250, claim 20, in part, drawn to the special technical feature of a method for treating a disorder characterized by aberrant production of the protein by administering a compound that modulates production of the protein, wherein the protein is encoded by the polynucleotides set forth in SEQ ID NO: 1-625, wherein values of SEQ IDs 1-625 of claim 18 correspond to values of SEQ ID NO: 1-625 of claims 1, 2 and 3. For examples,

If group 5626 is elected, this correlates to SEQ ID NO: 1 of claims 1-3.

If group 5627 is elected, this correlates to SEQ ID NO: 2 of claims 1-3.

Groups 6251-6875, claim 21, in part, drawn to the special technical feature of a method for treating a disorder characterized by aberrant activity of the protein by administering a compound that modulates activity of the protein, wherein the protein is encoded by the polynucleotides set forth in SEQ ID NO: 1-625, wherein values of SEQ IDs 1-625 of claim 19 correspond to values of SEQ ID NO: 1-625 of claims 1, 2 and 3. For examples,

If group 6251 is elected, this correlates to SEQ ID NO: 1 of claims 1-3.

If group 6252 is elected, this correlates to SEQ ID NO: 2 of claims 1-3.

The inventions listed as Groups 1-6875 do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The technical feature linking groups 1-6875 appears to be that they all relate to a polynucleotide. However it is apparent that SIGMA Catalog, 1999, page 1610 discloses a primer with poly T, wherein said primer renders claim 3 among others not novel (for example see SEQ ID NO: 314, poly A, and SEQ ID NO: 176, poly T), because poly T primer is capable to hybridize to SEQ ID NO: 314 and to a complement of SEQ ID NO: 176. This technical feature does not constitute a special technical feature as it does not define a contribution over the prior art.

The nucleic acids and proteins of each of the invention do not share the same or corresponding special technical feature with each other. The special technical feature of each DNA molecule is considered to be the structure as determined by its SEQ ID NOs: 1-625.

The special technical feature of each protein molecule is considered to be the structure as determined by its amino acid sequence encoded by the polynucleotides of SEQ ID NOs: 1-625.

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The antibody specific to the proteins of the invention has a special technical feature with respect to its structure and physicochemical properties.

Additionally the claimed methods do not share the same technical feature as set forth above and they lack unity of invention because methods are alternate methods of use.

Accordingly, Groups 1-6875 are not so linked by the same or a corresponding special technical feature as to form a single general inventive concept and so lack unity of invention.